NINETY-NINTH YEAR

AMERICAN Gas Journal

DECEMBER, 1957

Only Magazine Published Exclusively for the Gas Utility Industry

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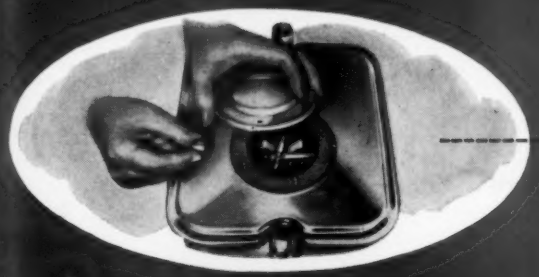
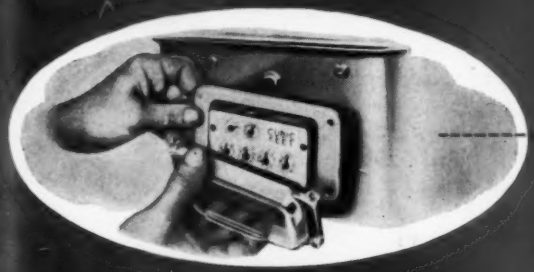
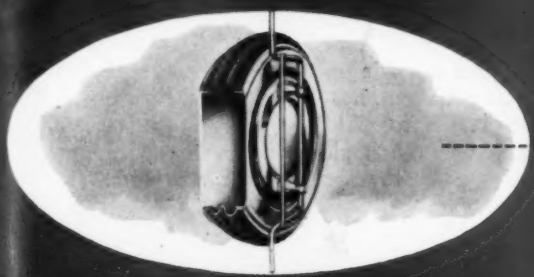


Hardcase meter accessibility through easily opened handhole.



Interchangeable index—external and isolated from pressure with gas-tight frictionless rubber grommet drive-shaft seal.



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why this key compressor station works dependably despite these

temperature extremes

Compressor Station One is the key supply installation on the sprawling Pacific Northwest Pipeline system. Located at 6000 feet elevation near Ignacio, Colorado, the facilities boost pressure of nearly 300-million cubic feet of gas per day from the San Juan Basin gathering system. This station feeds a nearby gasoline plant before starting the gas on the long haul to the Pacific Northwest market.

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This is but one example of the type of advanced engineering you get from Fish. In addition, the same quality service prevails from feasibility study to project completion. If you are contemplating new or expanded facilities in oil, gas or chemicals, consult with Fish.

the fish companies

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AMERICAN Gas Journal

NINETY • NINTH YEAR

GAS TECHNOLOGY — OPERATIONS — EQUIPMENT — MANAGEMENT — UTILIZATION

VOLUME 184 — December, 1957 — NUMBER 13

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YOU CAN GET MORE INFORMATION on 22 new and useful ideas or items of equipment developed for the gas utility industry. You'll find them on 47 through 51 . . . and to get more free information, use the handy reader's Ready-Reply Card bound in this issue. There's an extra card for your neighbor, too!

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Dean Hale
Editor
Pat Loar
Assistant Editor
Ernestine Adams
Economics and Management Editor
Donald M. Taylor
Gulf Coast Editor, JAckson 6-2631
2370 Rice Blvd., Room 110, Houston, Texas
Jan Craig
Editorial Production Manager
Donald D. Fickert
Presentation Editor
Lynn Patton
Editorial Assistant
Nelia McGranahan
Editorial Assistant
Leo T. Parker
Contributing Editor

Joe B. Woods
President and Publisher
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Assistant Production Manager

NEW YORK: **John Wallace, Clyde Dillehay**
52 Vanderbilt Ave., MUrray Hill 6-7232
CHICAGO: **E. V. Perkins, John McDonald**
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HOUSTON: **Jess Adkins, J. B. Forse**
2370 Rice Blvd., Room 110, JAckson 6-2631
DALLAS: **Ed Sealey**
800 Davis Bldg., Riverside 8-4403

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Printed in U.S.A.

Memo From The Editors

★ ★ ★

Letters

(Send your comments to The Editor, American Gas Journal, P. O. Box 1589, Dallas 21, Texas)

Handbook

GENTLEMEN:

Attached is check for $18.00, covering six new subscriptions to American Gas Journal for six of my associates who want your publication. Please be sure to include the new 35th edition of American Gas Handbook issue with their subscriptions. I am a regular subscriber to American Gas Journal and when I received the September 15 issue (Handbook) and showed it to them, they all wanted a copy.

L. G. Thompson, Group Engineer
Home Gas Company
Wellsville, New York

GENTLEMEN:

. . . enclosed is a check for 12 subscriptions to American Gas Journal for members of our department who want to receive a copy of American Gas Handbook and a year's subscription to your publication.

Frank Gaines, Group Engineer
The Manufacturers Light and Heat Co.
Pittsburgh, Pennsylvania

Editor's Note: We're pleased to learn that our Handbook is proving of value to so many men in the gas utility industry. Compliments continue to roll in on this 172-page contemporary reference book of the gas industry, which is chock-full of data. Supplies are getting low, however, and if you have friends who haven't ordered theirs with a subscription *(at $3 a year, a real bargain!)*, tell them to do so now.

Old Timer

GENTLEMEN:

Being one of the "old timers," for I joined the predecessor of the American Gas Light Association, in October 1905, at its annual meeting in Milwaukee, Wisconsin, that year, I am still definitely interested in the progress and success of the Gas Industry — progress that it has been showing in the past and continuing to enjoy today . . . .

In the years that I traveled through Indiana and Ohio on gas plant business, and that's 50 years ago, the only natural gas available in those areas was, to a minor extent, principally noticeable around certain hotel lobbies. The more abundant supply, generally observed, had its origin in Washington, unrestricted and uncontrolled, lots of it fully gratis. I believe it still exists there to some degree! . . .

Could I humbly request a recent copy of your journal to learn more precisely of its contents?

Edward L. Rieha
Gas Engineer
Baltimore, Maryland

Editor's Note: Your copy is on its way, Mr. Rieha. And many thanks for your comments comparing the old days to the present. We agree—we would probably not ever have to worry about gas reserves if we could only find some way to harness the production in Washington!

Fuel for Thought:

As 1957 draws to a close, and December's days are crossed off the calendar, it is well to reflect on the present and future of the gas industry. Days are getting colder and more gas is being sold than ever before. Planning for 1958 is in advanced stages. Throughout our industry there is an air of confidence and enthusiasm.

In some quarters — but not ours — harbingers of doom and gloom are riding their brooms through the economic skies, predicting dark times. We don't agree. Specifically, we disagree where the gas industry is concerned.

Since the end of World War II, the gas industry has experienced a phenomenal growth among major industries. Despite these tremendous overall gains, it has had a stable growth marked by sound yearly increases. To those who peer farther than "just around the corner," this trend upward will continue for decades to come.

For example, the gas distribution industry next year will spend (exclusive of production or transmission industry expenditures) in excess of $900,000,000, according to our latest estimates. This year — 1957 — over $800,000,000 will be spent. The 1958 expenditure of nearly a billion dollars will go to provide service for 1,000,000 or more new customers, plus improving existing facilities. More than 20,000 miles of new mains and services will be laid.

To make such an investment, the men who guide these companies must have considerable confidence in the future of their industry. They do. Comments from many of these gas industry leaders will be featured in the special *"Outlook — 1958"* section of our January issue.

In the waning days of 1957, as Christmas approaches and the New Year breathes on its heels, our thoughts should be filled with good will. Let us be thankful that we are a part of an industry that has always been confident of its future. To the harbingers of gloom and doom, we say, "Cheer up. Follow the gas industry to a brighter future."

Merry Christmas and a Happy New Year to all of you!

The Editors

In This Issue: Another Exclusive Reader Service

Ever needed a calendar of the important gas industry meetings that would be right at your fingertips when you wanted it? Ever been embarassed by having two "big" appointments on the same day — and wished you had an appointment chart that was really useful to keep such things from happening?

At one time or another, most of our readers have needed just such a device . . . something to help them plan ahead on their busy schedules of activities . . . a combination calendar and appointment chart that lists the important gas industry meetings . . . .PLUS room enough to write in important appointments.

In this issue, as an exclusive service to our valued readers, we are enclosing the *1958 American Gas Journal Calendar-Appointment Chart.* Attractively designed and printed in red and black, this calendar-appointment chart can be punched to fit in your notebook . . . or you can scotch-tape it to the slide-board of your desk for quick, easy reference.

We hope you find it as useful as we do. Extra copies are available while they last.

The Editors

Special AGJ Report:

Two Firms Promise Aggressive Selling In Bids for Gas Refrigerator Market

Dean Hale, *Editor*

The vast home market for gas refrigerators, vacated by Servel, is seen as an important new area of operations for two firms who haven't let much grass grow under their feet in their efforts to fill the void. The two firms, **Norco, Inc.,** of Los Angeles, and **National Gas Appliance Corporation,** of Chicago, in recent weeks have announced their respective entries into the gas refrigerator appliance field. Both firms will market refrigerators utilizing imported equipment. Programs laid out by the two firms assure the U. S. gas industry of at least one thing — there will be some healthy competition for the gas refrigerator business — a long felt need by the gas utilities who have an important interest in gas refrigerators. Gas refrigerators are estimated to contribute some $60,000,000 annually in revenues to the utilities — a potential worth backing. They are watching with intense interest these new developments. Here are reports on the two firms:

● **Gas refrigerators** in a complete range of sizes, including 2, 4, 7, and 11-cu ft models, operating on both natural gas and LPG, will be offered the U. S. market early in 1958 by Norco, Inc., of Los Angeles.

Featuring the square, slim-look line, the Norco gas refrigerator line has been American-designed to meet American standards of style and performance, points out Norman H. Lee, president of Norco.

Manufacture of the units is underway in West Germany, at the Krefft plant near Dusseldorf, a recently modernized factory employing over 2000 skilled workmen in facilities covering 1,000,000 sq ft. The Krefft plant, with over a quarter century in development and production of absorption refrigerators, is being utilized to produce refrigerators "with the right combination of quality and cost," Lee notes. Entire output of the factory will be for the U. S. market.

1957 model of Norco 6-cu ft convertible refrigerator.

Features of the new line will include a freezer compartment, built-in styling, and push-button or automatic defrosting. Of particular interest is the fact that the new Norco units will sell for considerably less than previously available gas refrigerators. The largest model will be priced at about $400, approximately $100 below the comparable Servel unit.

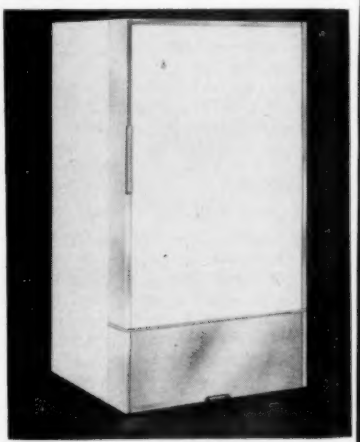
Production and marketing of the new Norco units was scheduled originally for late 1958, but the timetable was pushed ahead when Servel left the gas refrigerator business. Norco, founded by Lee four years ago, has been a leading marketer of gas refrigerators to the mobile home and LPG industries.

Norco is currently in the process of building a sales and service staff to handle its distribution and work with gas utilities. Augmenting its existing facilities in Los Angeles and Elkhart, Indiana, will be new warehouses and service plants planned for Dallas, New York City, and Atlanta. Sales and service personnel with long experience in gas appliances are being added to staff the new facilities.

● **A newly formed company,** National Gas Appliance Corporation, with headquarters in Chicago, has announced plans to manufacture and sell gas refrigerators in the U. S. under the trade name, "*Silent Frost.*" The units will feature a new, square cabinet design and utilize cooling units imported from Sweden.

The Swedish gas unit, using the absorption principle, has been made for 30 years, with more than 4,000,000 units in operation throughout the world.

The firm's plans call for production in three sizes — an 8-cu ft model with 25-lb freezer capacity, available in December 1957; a 10-cu ft model with 42-lb freezer capacity, available in April 1958; and a 12-cu ft model with 70-lb freezer capacity available in October 1958. Cooling units will carry a 10-year guarantee, backed by both the Swedish manufacturer and National Gas Appliance Corporation.



8-cu ft model of National's "Silent Frost" line.

Servicing — when required — will be handled simply. Servicemen will perform only minor repairs and adjustments. Any other service will be handled by replacing the complete unit — an operation requiring about 15 minutes and no special tools. National will maintain service centers in all major marketing areas and provide 24-hr service on both units and controls. Service personnel will be trained by the Swedish manufacturer.

Marketing plans call for the "Silent Frost" line to be sold through gas utilities where the utilities will promote, sell, and service the units. In other areas, the firm will sell through independent distributors or factory branches.

Prices on the units will be approximately 20 percent under current Servel prices. Features of the refrigerators include pull-out shelves, freezer chest, and automatic defrosting.

Future plans call for production of an ice-maker of simpler design, construction, and cost. Test units have been made and the ice-maker is planned for inclusion in deluxe models sometime in 1958, at no additional cost.

Mcf

Carrier Corporation has unveiled a new absorption type gas-fired air conditioner designed for installation with gas heating systems, converting them to year-around operation. Cooling apparatus is located in a cabinet outside the house, chilling water that circulates through a coil in the furnace. Carrier now produces large capacity machines of the absorption type, powered by steam produced in gas fired boilers.

Washington Natural Gas Company has completed three major construction projects in the Puget Sound region, giving it an integrated gas distribution system from Marysville to Olympia, Washington. Completion marked the end of major projects in the company's 1957 expansion program totalling $5,750,000.

Natural gas common stocks, following general trends of the securities markets, were down 9 percent in October to $35.16, compared to the price of October a year ago. Current yield of 5.38 percent, however, was an increase of 14.2 percent over the previous year. Dividend payments remained at a high average of $1.89 per share.

Full natural gas service is expected in Buenos Aires by mid-1959, when an ambitious program that includes piping gas from fields 2000 miles south of the Argentine capital is completed. Gas del Estado, the federal gas administration, plans to convert 180,000 units this summer (it's summer south of the equator) and complete conversion of another 240,000 units the following year. Cost of the project is an estimated $5,000,000.

New Jersey Natural Gas Company customers in Monmouth and Ocean counties have 5,000,000 cu ft more gas per day for their use with the completion of a new 26-mile, 8-in. supply line that cost $750,000. Residential and industrial growth in the area that has boomed in recent years was a major factor in building the line. The new supply line will also increase the efficiency of distribution operations in the area.

Rate increase of $1,100,000 annually for Gas Service Company was authorized by the Kansas Corporation Commission in November. The increase will amount to an average of 33.5 cents per month on domestic customer bills. The rate boost affects some 280,000 customers in 150 Kansas communities, including Kansas City, Topeka, Hutchinson, and Wichita.

Southern California Gas Company, in cooperation with city and county officials, has launched a program to tell Los Angeles residents about unvented space heaters — their proper use and the dangers involved. With an estimated 300,000 unvented space heaters in the area, officials from local health, fire, and building departments and the gas company are urging people to have their heating equipment checked to prevent deaths from fire and carbon monoxide poisoning.

Gas sales in September were up 1.5 percent over September 1956, reports the AGA. Sales to industrial users increased 8.6 percent for the month over the previous year. Natural gas sales were up 1.6 percent, while sales of mixed gas dropped 1.9 percent and manufactured gas sales declined 34 percent. For the 12-month period ending September 30, 1957, gas industry sales were up 2.8 percent over the previous year, with natural gas sales showing a 4.5 percent gain and manufactured and mixed gas sales dropping 32.3 percent.

New officers of the AGA Operating Section, elected at the annual meeting in St. Louis, include section chairman, Victor F. Bittner, assistant chief technical engineer, Peoples Gas Light and Coke Company, Chicago; vice chairman, Herbert C. Jones, gas engineer, New England Electric System, gas division, Malden, Massachusetts; and second vice chairman, Joe T. Innis, vice president in charge of operations, Northern Natural Gas Company, Omaha.

We are indebted to Southern Union Gas Company's company publication, *Southern Union News,* for the following item:

> Over in Tennessee, the lady of the house had never cooked with gas before, and she received explicit instructions from the gas company men. An hour later, they rushed back to the woman's home on an emergency call — there had been an explosion.
>
> The gas experts could find no mechanical explanation for this occurrence. When questioning the lady, she said she turned on the oven and then approximately 30 minutes later went to light it, "because one of you told me that the gas came from Texas and I thought it would take at least a half hour for it to get here."

Eastern Kansas and greater Kansas City area customers will have increased supplies of natural gas available to them by the end of the year as construction forces complete a new 30-in., 74-mile pipeline for Cities Service Gas Company, supplier to utility companies in the area. The $5,435,000 project is a part of the firm's $15,000,000 construction program slated for completion in 1957.

How much gas Canada will allow to be exported from Alberta, via the new Trans-Canada pipeline now under construction, is up in the air. All action in the matter of future exports was interpreted as being suspended for one to two years, following remarks by John Diefenbaker, Prime Minister, to the effect that a Royal Commission of Investigation would study the situation. How long such a study would take isn't known — and whether the Prime Minister meant a complete halt to plans for exporting gas or was merely reserving the right to determine how much could be exported. The statement was termed by political opponents of Diefenbaker as a terrific blow at the economy of Alberta, which is already plagued with an oil surplus. Also affected are plans by Midwestern Gas Transmission Company to import 200,000,000 cu ft of Canadian gas per day from the Alberta fields. These plans are currently being heard by the FPC. The Canadian government action could kill the Midwestern proposal because the FPC could not authorize import of gas that was not actually available.

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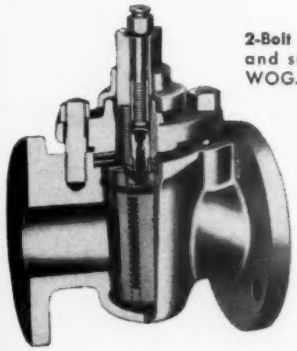
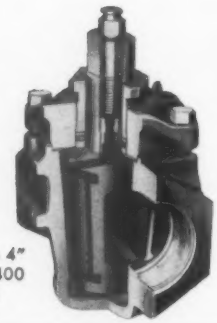
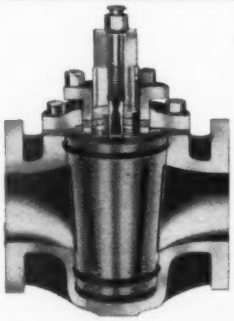


2-Bolt Cover Type Valve in 4" and smaller sizes for 175-lb WOG. *Semi-Steel*

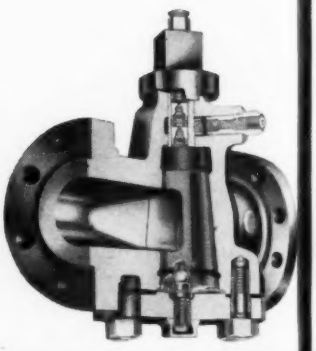


Screwed Gland Type Valve in 4" and smaller sizes for 200, 400 and 500-lb WOG. *Semi-Steel*



Bolted Gland Type Valve in 4" to 36" for 200 through 800-lb WOG Semi-Steel and ASA 150-lb and 300-lb Carbon Steel.

Hypreseal Valve—Bolted Bottom Cover Type. ½" to 30 by 34" for ASA 150-lb through 1500-lb Carbon Steel (with rectangular opening). API 2000-lb and 3000-lb WOG Alloy Steel Rectangular Opening. API 2000 and 3000-lb WOG Alloy Steel (with round opening).



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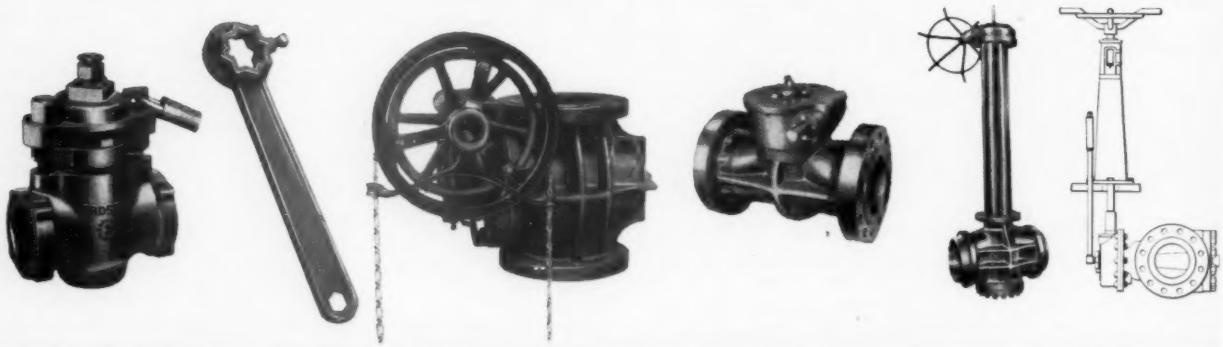

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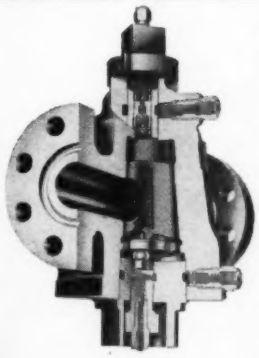
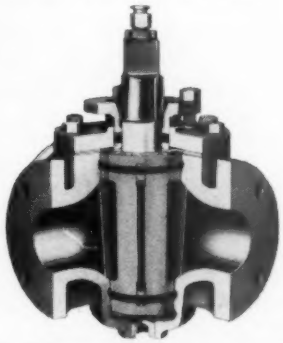


Hypreseal Valve—Screwed Bottom Cover Type. ½" to 8" for 7500-lb WOG Alloy Steel (rectangular opening). ASA 2500-lb Carbon Steel (rectangular opening). API 5000-lb and 10,000-lb WOG (rectangular opening) and API 5000-lb and 10,000-lb WOG (round opening).



Multiport Valve Type. Available in Gland type and Hypreseal type in WOG pressures to 400 lb and ASA pressures to 1500-lb. Sizes from ½" to 24".

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In *Every* Rockwell-Nordstrom Valve.

LEAKPROOF: Lubricant sealing is a *double* seal against leakage.

LONG-LIFE: Lubricant prevents metal-to-metal wearing friction.

LOW-COST: Lubrication is preventive maintenance.

DEPENDABLE: Hydraulic lubricant action jacks plug for instant operation.

QUARTER-TURN OPERATION: 90° turn for *full* positive shut-off.

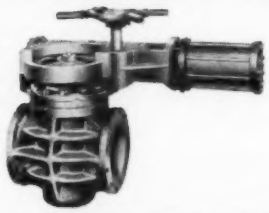
SMOOTH PASSAGE: Straight-through flow without crevices . . . minimum pressure drop.

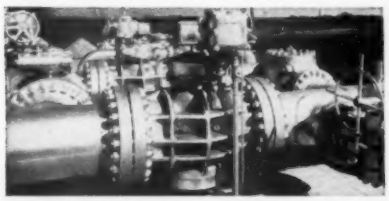
UNEXPOSED SEATS: Corrosion and erosion eliminated in vital seat areas.

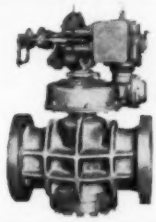
ADJUST, LUBRICATE UNDER PRESSURE: Never down time for routine servicing.

No other valve—at any price—can offer the performance and longer life at lower cost of Rockwell-Nordstrom valves.

POWER OPERATORS



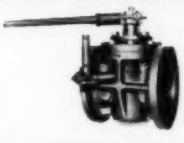


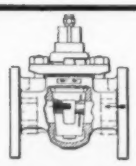


AUTOMATIC VALVE OPERATION is more dependable and economical when you specify Rockwell-Nordstrom valves. They are far superior to ordinary valves for power operation because *lubrication* reduces operating torque—smaller, less costly actuators can be used. And since there are no forced, wedged seats to be set, the actuator has only to move the lubricated plug through 90°.

Typical electric, pneumatic and cylinder operators shown above represent only three of the more than fourteen power operation arrangements available.

VALVES WITH SPECIAL FEATURES





NO MATTER WHAT YOUR NEEDS, there is a Rockwell-Nordstrom valve that will do the job better, longer and at lower cost. A few of the Rockwell-Nordstrom valves with special features are shown above.

Special metal valves are available in stainless-steel, bronze and other corrosion resisting alloys for even the toughest services. Valves with *hard faced plugs and bodies* combine the economy of semi-steel with hard facing for utmost corrosion and wear resistance. *Steam jacketed valves* for precise product temperature control. *By-pass relief valves* prevent pressure build-up that imposes dangerous stress on ordinary valves and fittings. *Gas safety control (Factory Mutual) valves* for positive control against explosion in multi-burner gas-fired furnaces, ovens and driers.

* * * *

Rockwell-Nordstrom valves and accessories are available at leading oil field and industrial distributors everywhere. For full information write: Rockwell Manufacturing Company, 400 N. Lexington Avenue, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

ROCKWELL-Nordstrom VALVES

Lubricant Sealed For Positive Shut-off

season's greetings

Al King
Western Canada

Chauncey Robinson
North Central and Eastern Canada

Charlie Hall
Mid West

Maurice Calaway
Far West

Walt Fitzgerald
North East

Irvin Peffley
South West

Seth Roberson
Home Office

John Worth
South East

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NATURAL GAS ODORIZING, INC.

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MUELLER CO.

growing with the gas and water industries

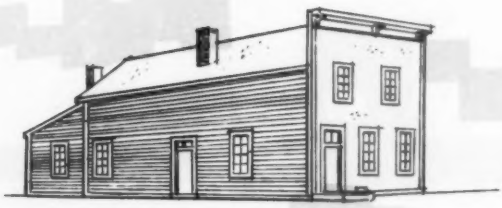
Founded in 1857, just one hundred years ago, Mueller Co. has grown steadily with the vital industries it serves.

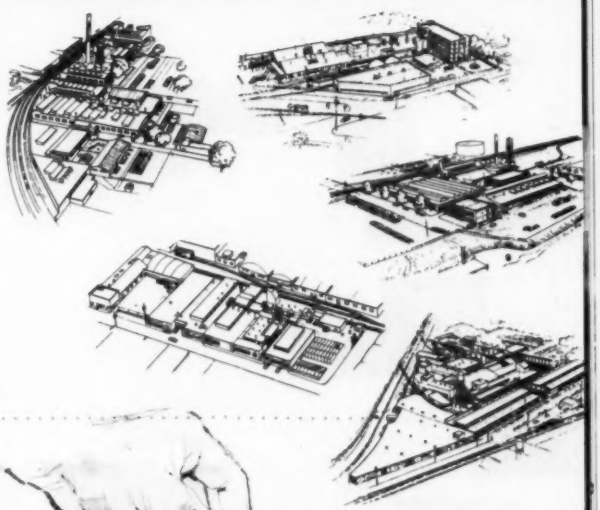
In 1857: Only one company in the United States was furnishing gas to its twenty-one customers; water sold for a penny a bucket from wagons; Hieronymus Mueller worked in a one-room, one-man shop in Decatur.

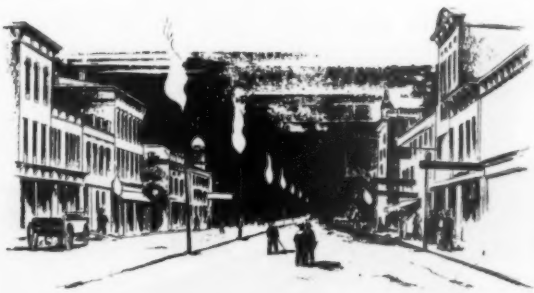
Today: Nearly 35 million Americans use gas for heating, cooking; more than 20,000 systems supply pure, fresh water to 130 million people; Mueller Co. is an organization with five modern factories, employing thousands of skilled craftsmen, manufacturing hundreds of quality products for water and gas distribution systems.

The water industry has made tremendous progress...the gas industry has had spectacular growth... Mueller Co. has kept pace with this march of progress!

1857 *1957*







engineering

New ideas—for new products and improvements on current products—are carefully analyzed and any with merit are passed on to trained project engineers for development. Approved designs are produced in the Mueller pattern shops by skilled craftsmen, and tested exhaustively—insuring performance in your equipment of tomorrow!

MUELLER ENGINEERS...

solving your problems of tomorrow–today!

As a major supplier of the equipment used by water works and gas companies, Mueller Co. research, engineering and manufacturing facilities are constantly striving to solve your problems of the future...and the answers are being found! New products, methods and equipment are being developed, current ones are being improved to further aid the growth of our vital water and gas industries.

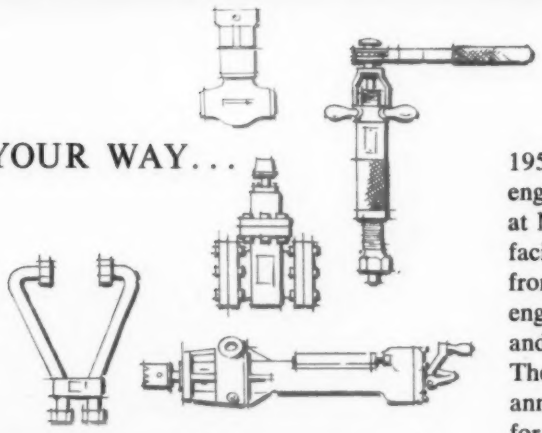
research

Metals, and other materials used in the manufacture of Mueller products, are subjected to rigorous tests and checks by laboratory technicians. This constant search is for improvements to provide longer life and safer operating methods in the products you are using today *and* tomorrow.

manufacturing

Production methods are under study at all times to gain gre accuracy and quality. New machine tools and equipment are constantly being added to Mue plant facilities to add still more precision to Mueller product Dependability—today and in the future—is assured!

COMING YOUR WAY...



1957 was a year of spectacular engineering accomplishment at Mueller Co. New engineering facilities were dedicated and from the boards of an expanded engineering staff came new and improved products. These products will soon be announced, and will be ready for you in '58!

"Watertown, U.S.A."....is a miniature city produced by the almost-lost art of diorama. Each tiny detail is reproduced in exact scale for its position in the scene and is proportioned to correspond to the overall "bird's eye" view. The perspective of each item is exaggerated to create an optical illusion which amplifies the depth. Through this means, a view of approximately 20 miles has been reproduced in less than 48 inches.

unseen...unheard... UNDERGROUND!

Vital as the water and gas industries are, they receive little recognition for the vast facilities they must provide to serve their customers. Their products and their service systems lie underground—unseen and unheard.

Yet the story of these underground facilities is both dramatic and interesting to the general public. People have a more definite respect for the problems of the gas and water industries when they see the maze of equipment beneath their towns.

To help tell this story, Mueller Co. has prepared "Watertown, U.S.A."...a spectacular diorama that shows the work and facilities necessary to serve a community.

This is just one more way that Mueller Co. is looking to the future—the future of the vital industries which it serves!

MUELLER CO. **DECATUR, ILL.**

Factories at: Decatur, Chattanooga, Los Angeles;
In Canada: Mueller, Limited, Sarnia, Ontario.

MUELLER CO. 100th YEAR SERVING the Water and Gas Industries QUALITY

Since 1857

step up
water heater
sales and
dependability!

ROBERTSHAW-GRAYSON CONTROLS

You can step up your water heater sales volume at every rung of the ladder from low priced leaders to higher priced, profit-packed, prestige models.

Start with the economy and dependability of the smart-looking UNITROL 110... step up to the more attractive UNITROL 200 for medium-priced water heaters... and then to the top for "the modern look" of the new UNITROL 400!

A point to remember—when you sell a prestige water heater, overall appearance and dependability *must* justify the extra cost! Start with the control!

Specify Robertshaw-Grayson controls from the bottom to the top!

Robertshaw-Fulton
CONTROLS COMPANY

GRAYSON CONTROLS DIVISION • LONG BEACH, CALIFORNIA

UNITROL 400
"The modern look"... a prestige control for prestige water heaters where you must justify a higher price to the customer. Features a greater capacity, 99,000 (natural gas) BTU per hour!

UNITROL 200
Four controls in one ... smart appearance enables you to trade up from the price leader class to a higher profit medium-priced bracket

UNITROL 110
Pilot gas cock, main gas cock, thermo-magnetic, 100% automatic shut off of pilot and main burner, snap action thermostat, pilot adjustment and pilot gas filter... all in one unit, attractively packaged in a new hard-baked gray enamel finish!

Here's how a typical Iowa distribution system uses a

Gas Leak Survey and Repair Program

Max J. Scott
District Operating Manager
Iowa Electric Light & Power Company
Marshalltown, Iowa

IOWA Electric Light and Power Company operates mostly within the state of Iowa, with the exception of the gas distribution systems in Sterling, Colorado; Fairmont, Minnesota, and five small towns in eastern Nebraska. The company serves about 59,000 gas meters, of which 6500 are in Marshalltown, the system referred to in this discussion.

From about 1910 to 1950, manufactured gas was used in Marshalltown, and was distributed at low pressure. A large percentage of the mains were cast iron, and the use of manufactured gas, which has an oily base, combined with the low pressure, did not create many gas leak problems.

In 1950 and 1951, distribution of natural gas began in Marshalltown. Initially, part of the town was operated at low pressure, and the remainder was converted to intermediate pressure. Quite a few problems were encountered in this change, especially when no attempt was made to delay the drying-out action by using oil fogging or other similar methods. An immediate rise in losses was expected, but was not experienced for nearly two years. The increase in losses did occur, however, and a perpetual, full-scale gas leak survey program was initiated. All leak detection is done by the company; none of this work is contracted.

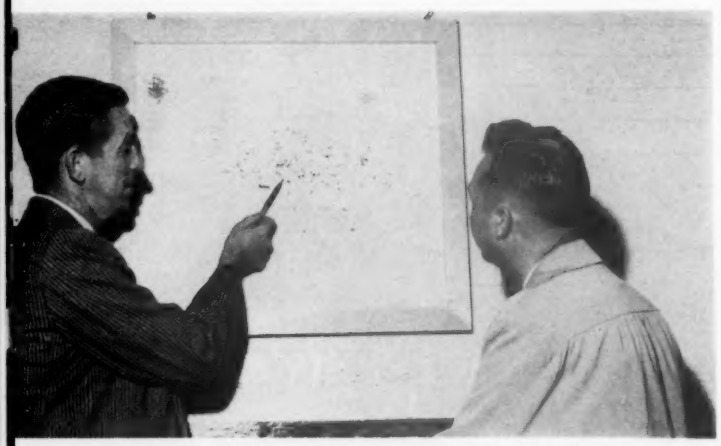
Under these conditions a program was established with two goals to accomplish:

First — Set forth a program of leak detection;

Second — Arrive at an orderly elimination of "known" leaks.

Full-Time Leak Detection

To start the leak program, several meetings were held, at which it was decided to assign an employee to full-time leak detection activity. In the summertime, he checks all mains and services. He does this by both vegetation observation, and probing with the gas leak detector. In the wintertime, he makes internal inspections, with the



Map showing known gas leaks on Marshalltown distribution system is checked by the author, Max Scott, left, and George Greiner, gas supervisor.

Leaking coupling is repaired by employee Ed Johnson.

Lawns are re-seeded, shrubs and dead trees removed after a leak has been repaired.

gas leak detector, and checks all business houses, schools, hospitals, factories, and residences.

During the wintertime inspections, all qualified employees help with the inspections to insure that all large use customers are checked more than once each year. Employees checking for gas leaks carry small hand tools so that, if at all possible, they can repair the leaks on the customer's premises at the time they are found. The result is complete coverage of the entire distribution system and residential customers once each year . . . and large users more frequently.

Over-Odorization Used

At frequent intervals, the system is over-odorized, knowing that it will increase the frequency of nuisance calls. While this is a "headache" to the service department — since they take all of the service calls — it does seem to make customers more conscious of the odor and presence of gas. Occasionally, prior to over-odorization, customers are notified of this activity through newspaper advertising, and their assistance in detecting any leaks is solicited.

When a number of leaks are found at one time, one of the biggest problems is to decide — if all of the repair work cannot be done at once — which leak to repair first. Supervisors are called together for a quick conference, and a decision is reached to determine which leak to repair first. This is based on the location, intensity, etc.

If one of the leaks happens to be next to the customer's house or commercial building foundation, it is repaired immediately. Many times it has been necessary to work unlimited hours . . . and overtime cards have been prevalent.

When a leak is found, a form is used that gives all necessary information, such as customer's name and address — what the leak is — and whether or not it was repaired.

Leak Records Kept

All of the "known" leaks are shown by colored pins on a map of the distribution system. After a leak has been repaired, the colored pin is removed and a white pin put in its place. By doing this, it can be seen at a glance, where the heaviest concentration of leaks is located.

This is a tremendous help when planning main and service replacement programs. The employee who keeps this map up-to-date receives the information from cards handed in by the employees actually doing the repair work.

Preventive Maintenance

All employees have been instructed on what to do when a leak is found. This includes meter readers, as they will be at each meter at least once each month, and a number of meters are located inside residences and commercial buildings.

When a leaking service is found, it is always replaced with new pipe. Mains are "repaired" — unless a section of bad pipe is found — and then it is replaced. Through a preventative maintenance program the company tries to replace the oldest pipe first. Internal inspections disclose numerous services defective through the basement wall. These are replaced, through the wall, if the rest of the service is in good condition. If not, a new service is installed. During this activity, meter loops are rebuilt where necessary, and when possible, are moved to the outside.

Bell Joint Program

As indicated previously, a major leak problem has been with the cast iron mains, with leaks resulting from the drier natural gas causing the bell joints to dry out. First major program undertaken was to "leak lock" 10 blocks of 6-in. main, all of which were under pavement. Considerable difficulty was encountered here, as not enough care was given to smoothing up the lead wool used in filling out the bell joint prior to installing clamps.

Trouble was also experienced because the joints were completely sealed when the lead wool was caulked, making it impossible to determine whether the neoprene gasket was tight enough to afford a good seal. Present practice is to use plaster-of-paris which, it is believed, makes a better seal, and speeds up the operation. This process has not been used long enough to determine its merits in preference to other methods.

Another major source of leaks in the system was found at the dresser couplings in long-time service that used older style gaskets. In most cases it was only necessary to clean the coupling and replace the gasket.

When leaks on mains are repaired during the summertime, winter pressures are re-created for test purposes.

After leaks are repaired, the company re-seeds lawns, removes and replaces dead trees and shrubs. This definitely improves public relations with our customers.

The program as described has been effective. In 1952, gas losses were very high — approximately 17 percent; losses are now down to about 2 percent, an 80 percent reduction in losses.

Acknowledgment

This article prepared from a discussion given at the Mid-West Gas School and Conference, Ames, Iowa, 1957.

★ ★ ★

Probe for investigating possible gas main leaks is used by Ray Farr.

Internal services are checked for possible leaks at least once a year.

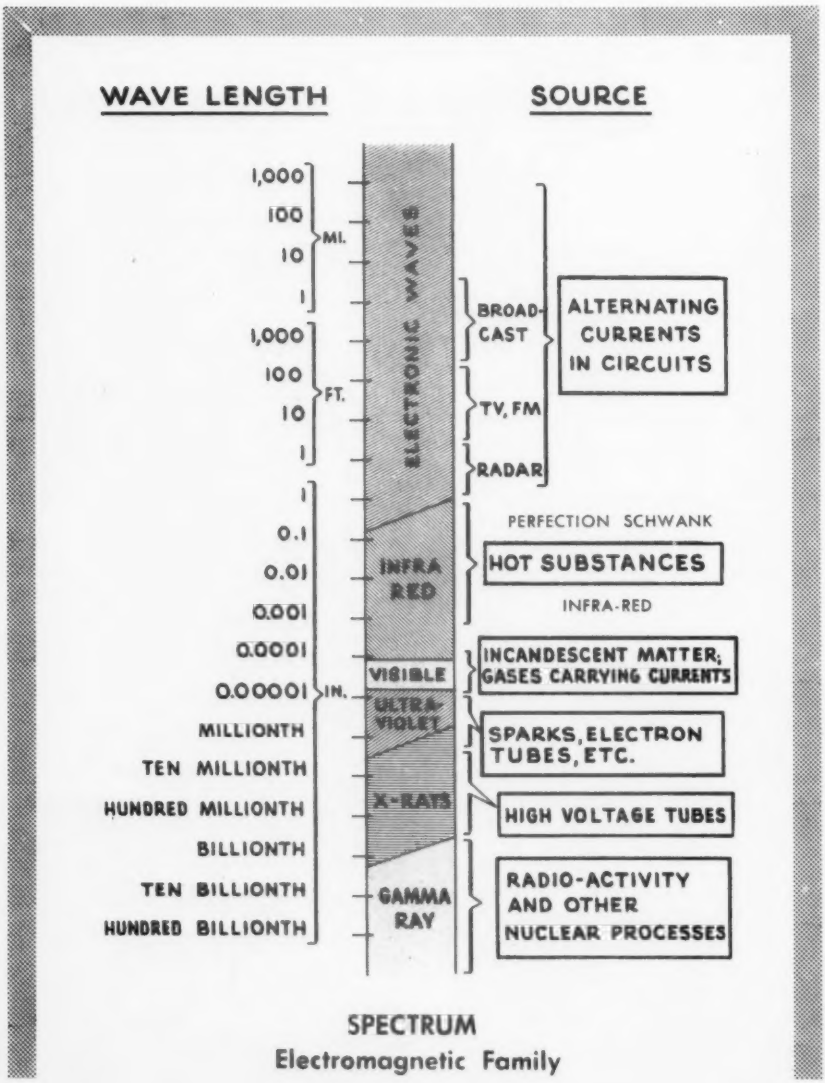
Crew at work repairing leaking coupling in Marshalltown residential street.

GAS - FIRED INFRA RED . . . What it is and How it Works

Marc Resek *Perfection Industries*
Division of Hupp Corporation
Cleveland, Ohio

GAS-FIRED RADIANT HEATERS have been used for many years, both for heating small rooms and for certain industrial processes. Possibilities for application of this method of generating and transferring heat have been vastly increased by the adoption in the United States of a type of burner developed in Europe, making practical the use of infra-red to heat high-bay buildings, as well as for industrial processes, and many other applications where convection heating equipment is not statisfactory or is expensive to operate.

Gas-fired radiant burners designed by Gunther Schwank of Cologne, Germany, have been used abroad for some years to heat places such as cathedrals, gymnasiums, exhibition halls, arcades, patios, outdoor cafes, and factories. A few years ago, Perfection Industries, Division of Hupp Corporation, acquired the rights to manufacture and sell this patented burner in America. It has adapted the burners to handle natural, mixed, and LP-gases and redesigned the heaters to meet the requirements of AGA and Underwriters' Laboratories, making them adaptable to many new uses.



SPECTRUM
Electromagnetic Family

What Is Infra-Red Heat?

Infra-red rays are waves of energy produced by the sun, a bonfire, or by a heated object. These rays are waves of force in space. They travel in straight lines at 186,000 miles per second. They do not affect the bodies through which they pass, only those which absorb them. Infra-red rays can be reflected with mirrors or focused with lenses.

The sun produces its infra-red energy by gas combustion. Perfection Schwank Infra-Red Heat Generators use the same system to produce controlled far infra-red heat energy.

How Unit Works

Gas-fired infra-red generators, which consist of a housing holding a ceramic mat, have a gas burner using 100 percent inspirated primary air and operate on the surface combustion principle to produce a glowing ceramic surface. No pre-mix or blowers are used. The air-gas mixture burns on the surface of the ceramic mat at a temperature of about 1600 F and gives off about 60 percent of its input as infra-red radiation. Heaters using these burners are assemblies of one or more generators with suitable mounting, gas manifold, pilot, safety shut-off, controls, and reflecting shade.

For space heating, a number of the heaters are usually mounted high up in the room with the radiant surfaces on the under side to direct the radiation downward, warming all objects below it without directly heating the intervening air.

Gas is controlled by an automatic valve, which may be operated manually

(Continued on page 18)

How Milwaukee Gas Light is Selling . . . GAS - FIRED INFRA RED

Owen R. Wagner
Milwaukee Gas Light Company
Milwaukee, Wisconsin

IN THE FALL OF 1956, Milwaukee Gas Light Company, Infra-Red Heating Corporation, and Perfection Industries, initiated a direct mail campaign to introduce gas infra-red to the industries in Milwaukee. Milwaukee Gas Light sent an initial letter with a brochure to 1138 industrial firms in its service area. Perfection Industries followed two weeks later with additional descriptive material and a letter. Infra-Red Heating Corporation followed with a third mailing.

To date, 44 replies have been received. Results of the follow-up on these replies by MGL industrial engineers and Infra-Red Heating Corporation personnel are:

Sales made	10
(about 1 percent of mailing)	
Future prospects	20
(about 2 percent of mailing)	
Information only	6
No Sale	8
TOTAL	44
(about 4 percent of mailing)	

Many sales have been made in addition to the above, which indirectly resulted from the campaign.

Certain sales were made that have become key installations for the entire program. They include:

The Rose Company, Milwaukee — result of campaign
Slinger Foundry Company, Slinger — result of campaign
Rath Manufacturing Company, Janesville
Felker Bros., Marshfield
Berlin Chapman Company, Berlin

Of these five key installations, three have made plans to extend this system based on its performance to date. They are the Rose Company which is replacing unit heaters in the original building with infra-red; Berlin Chapman Company, and Slinger Foundry Company, which is installing infra-red in its new plant at Sparta.

A partial list of other installations includes:

The Worden-Allen Company, Milwaukee; Downey Heating Company, Milwaukee; D-S Auto Body Shop, Milwaukee; Master Craft Inc., Rice Lake; Miller, Bradford & Risberg, Eau Claire; Cameron Products Manufacturing Company, Janesville.

Infra-Red is being installed in the following factories at the present time: *Milwaukee Crane Company, Cudahy; Grafton Foundry Company, Grafton; American Welding & Engineering, Milwaukee; ATACO Steel Products, Grafton; The Kelley Company, Milwaukee; Layton Company, Cudahy; Drott Manufacturing Company, Wausau; Green Bay Drop Forge Company, Green Bay; Waupaca Foundry Company, Waupaca;*

(Continued on page 19)

At Rath Manufacturing Company in Janesville, Wicsonsin, gas-fired infra red units like these shown are used for space heating.

(Continued from page 16)

or by a thermostat located near the floor. The entering gas passes through an air-aspirating chamber to the mixing tube where it entrains all the air required for combustion, and the mixture then enters another chamber, one side of which is covered with a ceramic plate having 7200 small holes. Gas passing through these holes is ignited by a pilot and burns on the face of the ceramic, which is heated by the gas flame to generate the infra-red.

The ceramic plate is made of a special refractory material, which is so light and of such low conductivity, that although red hot on the outer surface, it is cool on the inside, so that the flame will not pass through the small holes and back firing cannot occur.

The burner may be placed vertically, horizontally, or at an angle.

Each rayhead or burner is rated at 12,000 Btu per hr input, although for certain applications the input can be increased to 15,000 Btu per hr. One to four of these rayheads are incorporated in a heater, and several heaters may be mounted adjacent to each other with a single shade, when located at a high elevation (over 22 ft above the floor).

Many Applications

While gas infra-red heaters may be adapted to many heating applications, they are particularly useful for the following:

1. **For heating high-bay buildings, such as factories or warehouses.** This type of building is often almost impossible to heat by other methods, particularly if it is very high, or of uninsulated construction, or used for operations involving frequent air changes. Infra-red heaters can be located as high as desired, often placed above craneways.

2. **For warming humid storage buildings** to prevent rusting of steel or damage to other materials by moisture.

3. **For spot heating,** when it is not necessary to heat an entire building, but warmth in certain areas is needed.

4. **To provide heat for shipping platforms, bus loading areas, and other exposed spots,** where heating by convection would be impossible.

5. **For temporary heat in buildings under construction.** These heaters are particularly useful for such operations as drying plaster.

6. **For heating patios, garden restaurants** and other protected outdoor areas.

7. **For heating greenhouses.** The soil can be warmed while air temperature is maintained in a satisfactory range.

8. **For baking paint, drying chemicals and textiles, and other industrial processes requiring heat.** In these applications, the burners are located and arranged to radiate the infra-red directly on to the material.

9. **For heating dies and drying molds.**

10. **For thawing frozen cars of coal or ore.** Heaters are located in tunnels through which the cars are moved. Mines and railroads find this system permits operation during periods when formerly it was necessary to shut down because the contents of the cars could not be dumped.

Infra-red is efficient for all of these uses because the radiant energy does not heat the air through which it passes, but travels at the speed of light to all objects within view of the heated surface, and is converted to heat when it strikes an object.

For example, an overhead heater in a factory radiates its heat downward, warming floors, machinery, and personnel. The floors, in turn, reradiate part of the heat, so that workers feel heat from below as well as above, and if the heaters are properly placed, are extremely comfortable at comparatively low air temperature. Occupants' feet are warmed by the warm floor and their hands are not cold because machinery, equipment, and tools, which they touch, are warm.

Air near the floor is heated enough so that the heaters can be controlled by thermostats placed low on the walls, while the warm floors and equipment act as a flywheel and keep the room comfortable during the period that the heaters are off.

Since the air is not directly heated, its average temperature from floor to ceiling is low, and since heat is not directed to the outside walls, they are comparatively cool. These two factors minimize the heat loss, (both transmission through the walls and transfer due to air change) and reduce heating cost.

This advantage of radiant heating is particularly noticeable in high rooms, in structures made of metal without insulation, in areas having considerable ventilation, in places open to the outdoors, and where heat is wanted only in isolated spots.

While these conditions require the provision of increased amounts of radiant heat to take care of the added losses, the use of infra-red makes possible comfortable conditions at reasonable cost, where convection heat would be unsatisfactory or prohibitively expensive.

Installation

Design of a heating system using the gas infra-red heaters differs considerably from the design of more common types of heating plants. For one thing, the amount of heat needed varies with the floor area and some of the factors entering into usual heat loss calculations are relatively unimportant. Height at which the heaters are located, type of shade used, and size of individual heaters must be correctly worked out to obtain proper heat distribution.

The manufacturer furnishes the necessary data to aid the heating engineer make a satisfactory layout.

Because of the large number of comparatively small units usually distributed around the space to be heated, it is not generally practical to provide each heater with an individual vent. Instead, products of combustion pass out of the building through roof ventilators. Individual vents are not needed because the units (approved by AGA as unvented heaters) are installed well above the breathing level, products of combustion (which are warm and light) rise and pass out of the roof vents, and the entire upper part of the building acts as a collecting hood, so that combustion gases are not present at the breathing level.

In most places having building codes, recognition is given to this type of heating as acceptable without individual flues for non-residential occupancy, where the building is suitably ventilated.

In every case, enough ventilation must be provided to prevent condensation on cold, uninsulated ceilings.

Operating Cost

Many factors affect the operating cost, but there is usually a considerable saving compared with other methods of heating with gas.

Experience indicates that a typical small, uninsulated building, located in Ohio, heated by 1050 Btu natural gas costing 65 cents per Mcf can be kept at a comfortable working temperature at a cost of .024 cents per 1000 sq ft of floor space per degree day. For example, a building of 5000 sq ft in a climate having 6000 degree days per heating season, could be heated for $720 per year.

Advantages

A few of the advantages of gas infra-red heating are:

- Radiant heat shining on workers makes them feel warm in the coldest weather; there are no drafts. Elimination of cold floors and drafts tends to reduce colds and resulting absenteeism, paying dividends in better health of employees.

- Floors, stock, and machinery are heated by the radiant energy they absorb, and workers feel warm because they do not get cold feet and cold hands. Users say they have never been so comfortable in cold weather.
- Areas, which have been impossible to heat with other systems, can be heated easily with the Perfection Schwank system, which makes workers comfortable on shipping docks, in high-bay uninsulated buildings, and in other areas where ordinary types of heat are carried away so fast that workers suffer from the cold and most of the heat is wasted.
- Heat can be concentrated in the area where heat is needed and it can be thermostatically controlled to maintain any desired level of temperature.
- Heating costs with this system are less than with other types of heaters because the heat is applied directly to the objects to be warmed instead of to the air. Consequently walls are not overheated and heat losses are minimized.
- Use of gas radiant heating for industrial processing allows the heat to be concentrated on the parts to be heated, and since natural gas is cheap, cost of most industrial heating processes is reduced by use of gas-fired infra-red generators.
- For such operations as car thawing, the use of gas infra-red allows the application of enough heat energy to accomplish the objective quickly and cheaply.

While this type of heating is not necessarily best for every purpose, there are many applications where it is far superior to equipment now in use.

* * *

(Continued from page 17)

Sparta Manufacturing Company, Sparta (new plant of Slinger Foundry Company).

Two additional promotions were made during this introduction period.

1. Pabst Brewing Company held a style show the first week in March in an outdoor patio heated with infra-red. Considerable newspaper publicity was given this event.

2. The Milwaukee Braves installed portable heaters in the bull pen to keep the players warm during their usual chilly spring weather. As a result of this installation, they have considered installing infra-red in the stadium for the spectators.

Some Infra Red installations are presently being metered separately in order to obtain some accurate figures on operating costs. These figures will be translated into cents per degree day per square foot of floor area for different types of buildings. This will provide a necessary tool for further promotion.

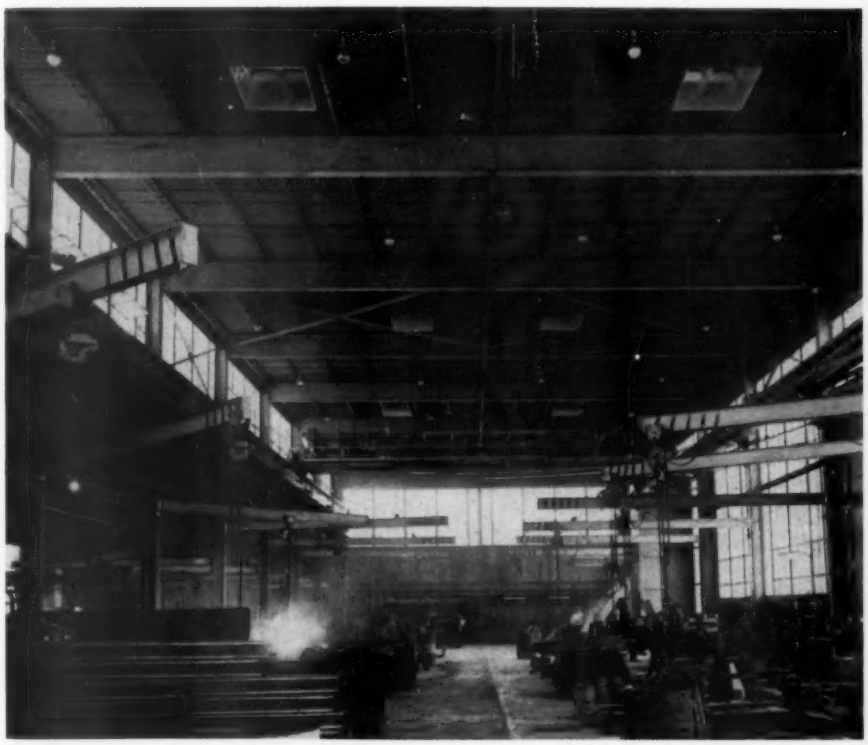
Infra-red's value for space heating lies in the fact that it can heat buildings formerly considered impossible to heat. The units do not have to be vented individually. Venting can be accomplished with an ordinary exhaust fan or ventilator at the peak of the roof.

There are over 40 different applications of infra-red to industrial processes at the present time.

One example of a new application devised is the drying of ceramic condensers at Sprague Electric Company of Wisconsin in Grafton. This operation had been performed by banks of electric infra-red bulbs; an increase in production was desired and space at a premium. One gas infra-red unit was tested and as a result, production was increased, operating costs lowered, and maintenance costs substantially decreased because the gas units do not have to be replaced.

Infra-Red gas generators provide new and interesting applications for our customers and prospects. They permit the gas utilities to invade a field that has been the private empire of its electric competition. One installation on Milwaukee Gas' lines produced $3000 revenue the first month of operation. An accurate evaluation of promotional efforts is difficult to obtain due to word of mouth advertising by users; however, Milwaukee Gas is convinced that direct mail with follow up personal calls gets results.

* * *



Infra Red units are especially adaptable for space heating in high-roof, large bay corrugated buildings, such as this one of the Rose Company in Milwaukee.

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LubOseal® gas meter stops

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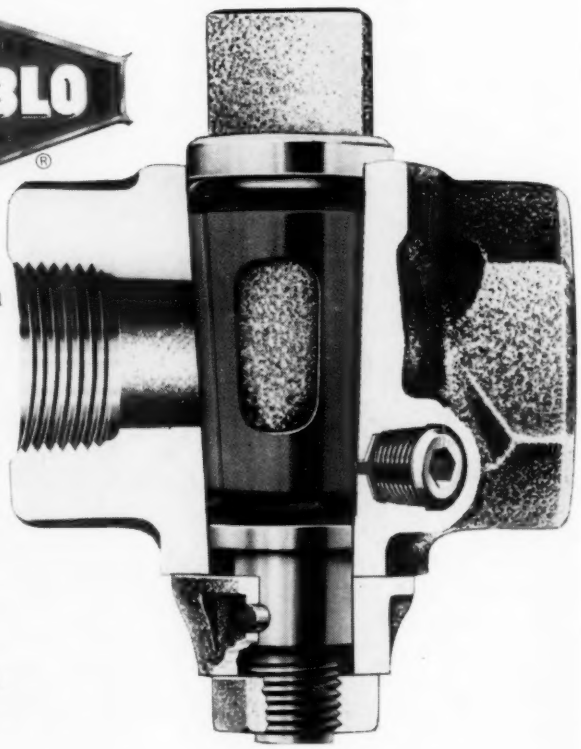

"O" rings located at top and bottom of the lubricated key give double protection against leakage of gas to the atmosphere. Precision ground key is individually lapped into body to prevent leakage through the port when stop is closed.

And the LubOseal is permanently operable. Lubricant is forced in and stored under pressure around "O" rings through an independent port in the body. Lubricant is evenly distributed around entire key each time the stop is operated to insure permanent, easy turning.

Replace inoperable gas meter stops with the LubOseal. You can do it quickly and safely under pressure with the Mueller NO-BLO® Stop Changer. See your Mueller Representative or write direct for complete information.

H-11170 Plain Head
H-11175 Lock Wing
Black or Galvanized
Sizes 3/4" through 2 1/2"

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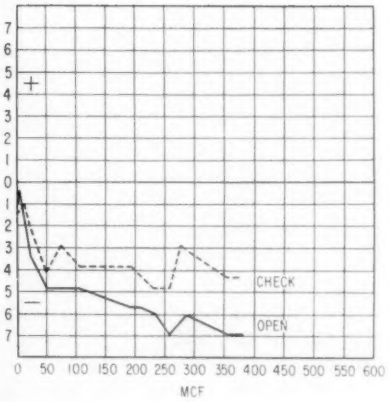

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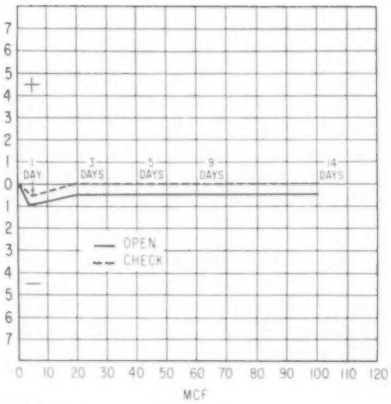

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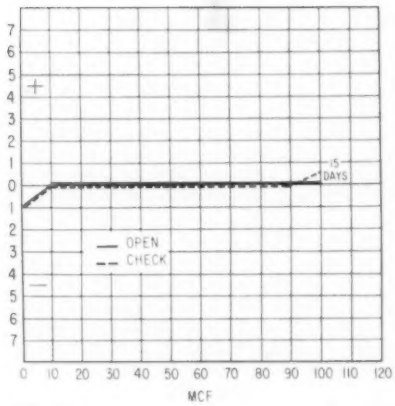

FIG. 3.

CASE HISTORY:

Montana-Dakota's Experiences with Test Frequency of Gas Meters

A. F. Kyhos, *Gas Engineer*
Montana-Dakota Utilities Company
Minneapolis, Minnesota

MONTANA-DAKOTA UTILITIES COMPANY has about 90,000 gas meters of various makes and ages on its lines; approximately 3000 (about three percent) are tin meters, and the remainder are hard-case. Montana-Dakota is a young concern as gas utilities go; yet its 1956 annual report was the 33rd put out by the company. During that period it has been, generally speaking, distributing natural gas. All figures quoted in this article are taken from meters that have been used (nearly) entirely in natural gas service. During the company's corporate existence, it has acquired small gas properties that distributed other gases, but the percentage of these meters weighted into present day totals loses all significance.

Natural gas distributed by the company is clean and dry. The greatest percentage of its meters have never measured anything else. A five-year test cycle is used for domestic meters in Montana and an eight-year periodic cycle in Wyoming, North Dakota, and South Dakota. In North Dakota, the eight-year cycle is by special permission of the regulatory commission, based on a favorable showing, whereas the permanent rule is five years. Of the total meters, therefore, 36,000 are on a five-year cycle and 54,000 are on an eight-year cycle.

During the waning years of World War II and the period shortly after, suitable materials were extremely difficult to obtain in nearly all lines. Gas meters were no exception. Lowered quality and substitutes were better than none at all; the company bought what it could get. Unfortunately, diaphragm leathers were of inferior quality resulting in subsequent shrinkage. Short stroking diaphragms causing excessive speed-up of the meters have plagued the company during the past five years, just when many meter men had about convinced managements and commissions to permit longer test cycles. High bill complaints and refunds confused billing departments and brought down the wrath of the public relations people. The "post-war babies" were coming in for their first periodic tests and what an unlovely picture they presented.

An extensive program of investigation was begun to determine the possible causes of meter speed-up, and what could be done to improve the situation. Ed Gilmore, prominent figure in the meter field, devoted a great deal of his time in the spring of 1953 to a series of meter schools for the company. That was shortly after he had developed his electro-cardiograph for the purpose of studying the interior of a meter in operation. This instrument is a slope gage recorded. A number of these graphs were made at the various meter shops visited, and then, without opening the meters, diagnoses of possible difficulties within the meters were made. After the diagnosis was made, only the indicated operation was performed — and the meter was proved again. It is astounding how much can be learned from such an approach. Many metermen found out how to properly interpret a slope gage, and how to properly inspect, evaluate, and repair a gas meter.

After carefully studying results obtained from the meter school, it was realized that, while there was no doubt that inferior materials and substitutes created by conditions beyond reasonable control caused a great deal of the meter troubles, improvements in shop practices have resulted not only in better performance of the personnel but far better work on the meter.

To permit evaluation of all factors affecting meter proofs and proof longevity, a study of hundreds of meter history cards was undertaken in several of the company's meter shops. Of particular interest was determining if a new meter would hold its proof longer than a meter coming in for its second or further test.

This was done by comparing proofs of meters coming in for the first test

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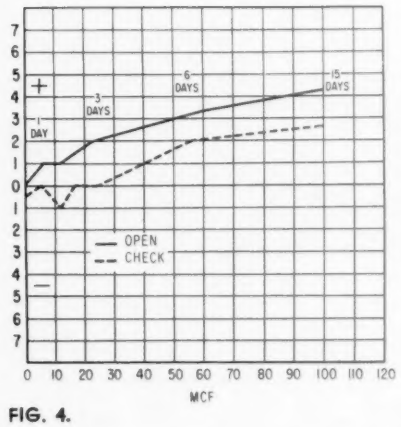

FIG. 4.

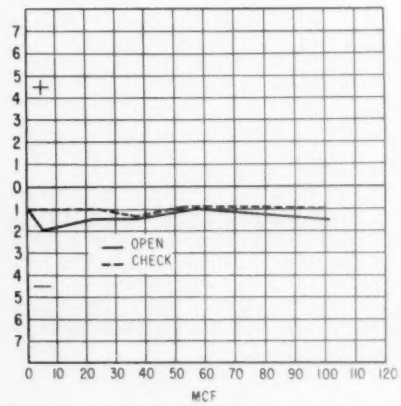

FIG. 5.

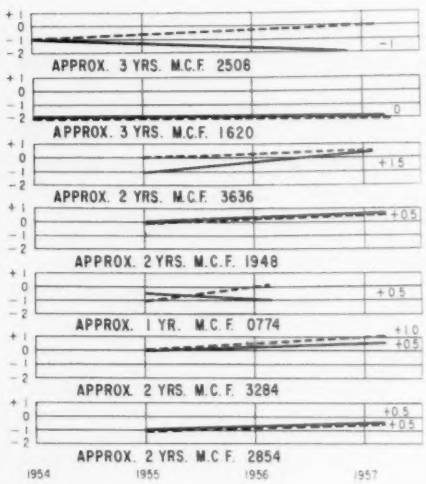

FIG. 6.

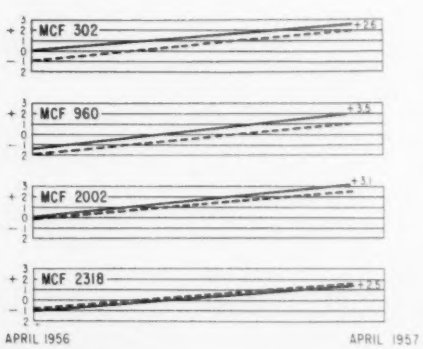

FIG. 7.

(new or re-diaphragmed) with those that had been in the shop before and had been sent out again with only minor adjustments — that is, work done only above the gallery plate.

Requirement in this case was that the meter be a seasoned one and that the work done on it was adjusting only, with the possible exception of new collar bushings and new neoprene washers in the index stuffing box.

While a large number of cards were studied, this information is not yet recapitulated sufficiently to draw average conclusions. Typical (if not average) cases of individual meters are shown on the series of graphs shown in the article.

On all graphs, the dotted line indicates the check test; the black line indicates capacity. Even though the graphs show the higher rate as "open," a capacity cap was used. To obtain these tests, the first group of meters was operated by a vacuum cleaner.

● **Fig. 1** shows a 250 Rockwell meter operated at 1000 to 1200 cu ft per hr. No accuracy was expected. Original purpose of this test was to determine the longevity of synthetic diaphragms. Actually all that was proved is that synthetic diaphragms will outlast a vacuum cleaner.

● **Fig. 2** shows a Metric 5B meter operated at capacity or less with synthetic diaphragms; it passed 100,000 cu ft in 14 days and held its accuracy.

● **Fig. 3** is a 250 Rockwell and, as the two previously discussed, was also a sample meter. It had synthetic diaphragms, was operated at capacity or less, and passed 100,000 cu ft in 15 days. This meter also held its proof.

● **Fig. 4** shows a 250 Rockwell from stock, operated at capacity or less, with leather diaphragms. This meter also passed 100,000 cu ft in 15 days and speeded up a little more than four percent on the capacity, and three percent on the check. It also indicated that it will continue to speed up.

All of these meters were tested a number of times during the 15 days; the proof curve is accurate.

● **Fig. 5** is a Sprague 240 from stock, operated at capacity or less, with leather diaphragms. It passed 100,000 cu ft in 14 days. This meter has a good proof curve and held its proof within one-half of one percent.

Due to the accuracy maintained by this meter, it was decided to test some meters that had been in actual service. The next group of graphs show these meters.

● **Fig. 6** shows seven Sprague meters. The change in proof runs from 0 to a maximum of 1½ percent.

After testing these meters which had been in service, and finding such good results, it was decided to test another group.

● **Fig. 7.** This graph shows four 250 Rockwells that were tested. These meters are quite uniform, with minimum speed-up of 3½ percent. This group would have been within the OK limits if they had been properly adjusted on the out test. By this is meant, that if the company rule of setting new meters with leather diaphragms two percent slow had been followed these meters would have been within the acceptable limits of plus or minus two percent.

Time in service for all these meters is one year and the consumption is shown on the graph.

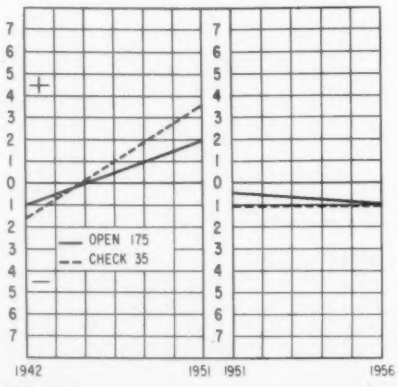

FIG. 8-A.

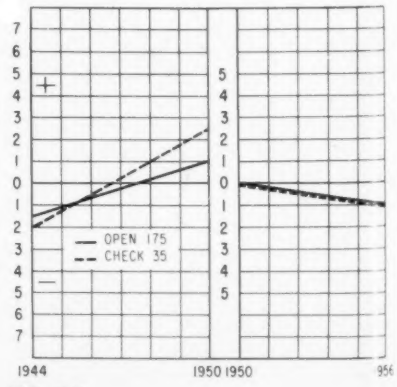

FIG. 8-B.

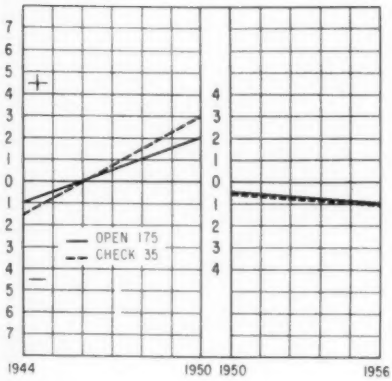

FIG. 8-C.

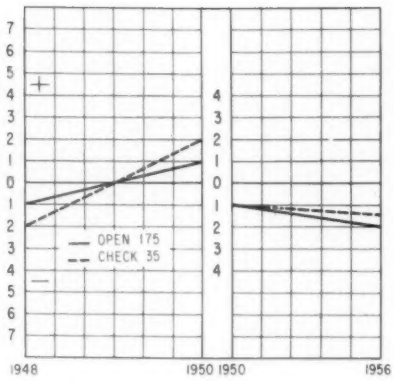

FIG. 8-D.

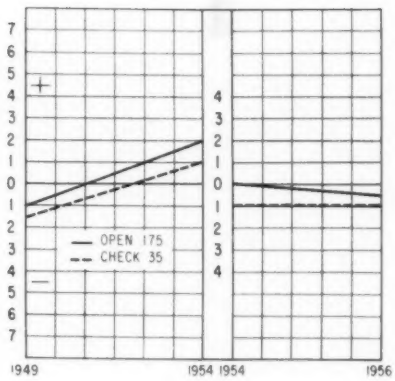

FIG. 8-E.

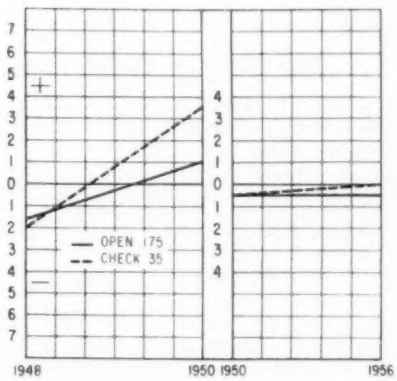

FIG. 8-F.

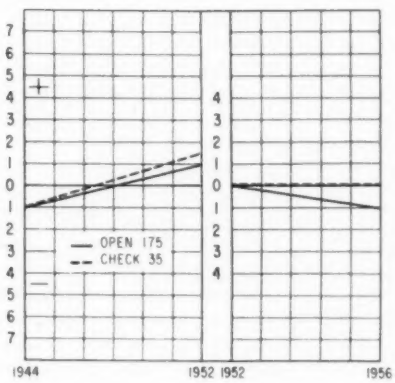

FIG. 8-G.

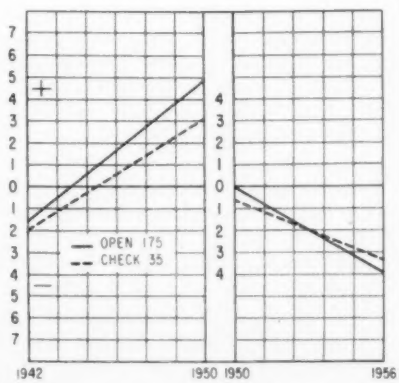

FIG. 8-H.

● **Fig. 8,** (group of several graphs) shows how a seasoned meter will hold in proof, indicating that the less done to a meter when it comes in for test, the more accurate it will remain.

These meters were adjusted only, with the exception of possibly new collar bushings and replacing the neoprene washers in the index shaft packing.

The group includes Sprague and Emco meters, new and repaired. There is a similarity of proofs during the time they were speeding up and after they were adjusted. Seasoned meters have a tendency to slow down. The last graph shows a meter with inadequate leather originally and on which the diaphragms should have been replaced at the time it came in for periodic test in 1950.

Montana-Dakota is now committed to using synthetic diaphragms for all new meters as well as all replacements for present meters.

Studies so far indicate that a 10 (or even 12) year cycle on meter testing is practicable. With improved materiels for meters today, this is not unreasonable. So far, in 1957, incoming meters, including those received for periodic testing as well as others, indicate that attention given to this matter is paying off. For the four years of 1953 through 1956, incoming tests showed as follows:

Meters within ± 2% proof	60%
Meters over 2% fast	30%
Meters over 2% slow and stuck	10%

Whereas so far in 1957 incoming tests show:

Meters within 2% proof	75%
Meters over 2% fast	17%
Meters over 2% slow and stuck	8%

Note that there is a continuing undesirable balance between fast and slow meters. This is probably due to left-over meters of the "post-war baby" type; when these have been completely run through the shops, this balance will improve.

Finally, conclusions have inevitably pointed toward continued attention to meter shop practices and the need for striving for improvement there. With cost of labor and repair parts increasing out of proportion to increases in rates for gas sold, there is concern with the cost per meter per year. The longer the periodic test can be extended, the better job can be done on each meter repair — at a lower cost per meter year.

This article has principally discussed domestic meters. Large meters are on a five-year basis; studies indicate that this could be reduced somewhat, at least in cases where meters are operated at near capacity for considerable periods of time.

In summary, it is obvious that the longer the periodic test cycle can be extended, the more attention can be devoted to the maintenance of the gas meter at a materially lower cost per meter per year.

From a study of the graphs, it is obvious that the less done to a meter at its periodic inspection and test, the better the future performance of that meter. Experience indicates that, where a diaphragm condition shows need of replacement, it is best to replace with synthetics.

Montana-Dakota does not re-oil leather diaphragms for the very good reason that, since most diaphragms do not require re-oiling, those that do dry out in service will likely continue the same pattern if re-oiled. The company is also convinced that meter shop practices require constant attention; they cannot be established and forgotten. ★ ★ ★

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FIG. 1.

FIG. 2.

Modern Methods of Service Request Dispatching - 3

W. E. Von Almen, *Supervisor*
Customer Service Training
Southern California Gas Company
Los Angeles, California

Dispatching Set-Up Handles 1,000,000 Orders Annually

SOUTHERN CALIFORNIA GAS COMPANY serves a large portion of the rapidly growing Southern California area and a major portion of the San Joaquin Valley. The company has experienced tremendous growth, especially in the post-war period. Since 1947, over 60,000 meters have been added to the system each year. At the end of 1956, the company served over 1,500,000 meters in more than 160 communities.

A large organization is necessary to serve properly the more than 4,500,000 people included in the service area. To do an effective job, about 5600 employees are required throughout the system. On a geographical basis, the system is divided into 10 operating divisions. Each division is composed of representatives of the various operating departments. While the divisions are separate operating units, general policies and procedures are determined by the general office.

The customer service department is one of the operating departments represented in the divisions. It is responsible for satisfaction of customers' requests for prompt service and at the same time, for utilization of service personnel efficiently. The method used to satisfy our customers' requests (which we believe will increase our customers' acceptance of gas as the modern fuel) is a group of over 700 servicemen. It is up to these men to answer and satisfy all customer requests, and to complete company orders like the periodic meter changes required by the California regulatory body.

To use these servicemen efficiently and to perform service when promised are the jobs of the various customer service dispatch offices in the 10 divisions. Dispatch machinery in the central division is unique in the system because of the division's size. Approximately 40 percent of the system's customers are served by nearly 300 servicemen operating out of eight bases in the central division.

The central division dispatch office handles approximately 1,000,000 orders a year, varying on regular working days from 2000 to 9000 orders. Company policy is to make appointments with customers on all service requests. This makes the dispatching of the 300 servicemen all the more complicated. Making more appointments than can be handled by the available servicemen must be avoided. In addition, nearly 30 percent of the orders received each day are completed on the same day the customer places the order. This is done in accordance with an order execution schedule.

These "same day" orders are dispatched to servicemen by telephone and radio. The balance of the day's receipts is prepared during the swing shift into full-day routes and is delivered to the eight bases ready for the servicemen to take them into the field at the beginning of the day.

In addition to the dispatch functions and the subsequent summarization of completed orders, the dispatch office also handles routine clerical work for the customer service department including:

1. Calculation of servicemen's production.
2. Appliance parts replacement program.
3. Appliance warranty records.
4. Air conditioning warranty and maintenance records.
5. Curtailment records and notification of customers on interruptible rate schedules.

But what are the mechanics of this dispatch system? How are customer orders taken? How is a balance maintained between the work load and the available manpower? How are internal orders used to balance the load? How is the work routed to the servicemen? What happens to the completed orders as well as to those orders not completed? These are some of the questions which we shall attempt to answer.

Receiving Customer Orders

Service requests from customers are received from two main sources:

FIG. 3.

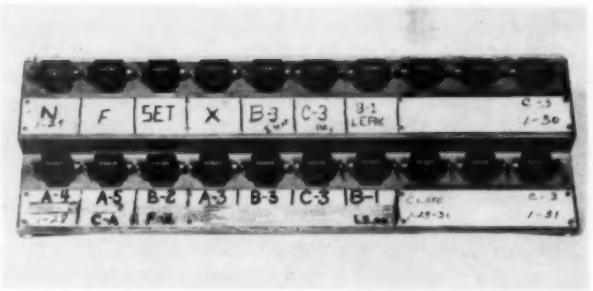

FIG. 5.

1. **Offices of the customers' department located throughout the central division.** Customers come in or telephone orders to these offices. The local representative schedules these orders according to the order execution schedule. If the order is the type which is handled on the same day as received, the order is then telephoned to the central division telephone order board where the order is written out and sent to the dispatch office through the company mail system.

On all turn-ons and turn-offs (and other service requests when time permits) the order taker puts the ledger number of the order in the designated square so that the order may be assigned to the correct route and/or individual. In central division there are 59 sections which are broken down further. This eases the job of routing the orders.

2. **Customers department telephone order board (Fig. 1).** Bulk of customer requests are received on the telephone order board maintained by the customers department. The board is composed of approximately 70 women. All customer calls concerning emergencies, requests for turn-ons and turn-offs, appliance adjustments, information on bills and accounts, and miscellaneous requests are placed with the board directly. Over 80 percent of the calls received are service requests.

After the order clerk takes the order, it is placed on a conveyor belt and goes to the general files of the order board office. At the conveyor, terminal orders are sorted and checked for accuracy. Turn-on orders are made in triplicate and turn-off orders in duplicate. One copy is filed in the order board office for future reference. A copy goes to the customer service dispatch office for routing to the field. Third copy of the turn-on order is for the customers accounting section to set up its billing and credit records.

Only one copy is made of requests for service other than turn-ons and turn-offs. This single copy is dispatched to the field. Need for reference copies is so slight that no copies are made, eliminating a large filing expense. Many service requests are handled by the women on the order board itself. This type of request usually involves inoperative ovens because the pilot has gone out and the automatic safety is in operation. Order clerks are trained to help customers relight their pilots. This helps ease the order load of the Dispatch Office and gives customers immediate use of appliances.

Types of Order Variation

Two general types of load balancing are required. First, the *seasonal variation* in customer requests for service ranges from 60,000 a month during the summer months to 100,000 a month during the winter months. This seasonal variation is handled by the scheduling of vacations for servicemen during the summer when the work load is comparatively light, and by absorbing excess manpower in changing old-age meters and the handling of other company initiated orders. This variation is also helped by having a choice of service policies to follow.

One policy, called *extended,* provides complete service to all gas appliances rather than to only the "cause of request" appliance. Another policy is the so-called *regular,* where the servicemen work only on the "cause of request" appliance unless requested otherwise by the customer. A third policy called *peak* is where the servicemen work only on the "cause of request" item on the appliance. As indicated by its name, the *regular* policy is used most of the time. With a change of service policy, it is possible to meet a fluctuating work load.

The second load balancing problem, which is the most difficult to control, is the *day-to-day variation* in the work load which may vary from 2000 to 9000 requests for service in a single day. It is, therefore, necessary to maintain a rather elaborate system of control if during these peak periods appointments are still to be kept with customers.

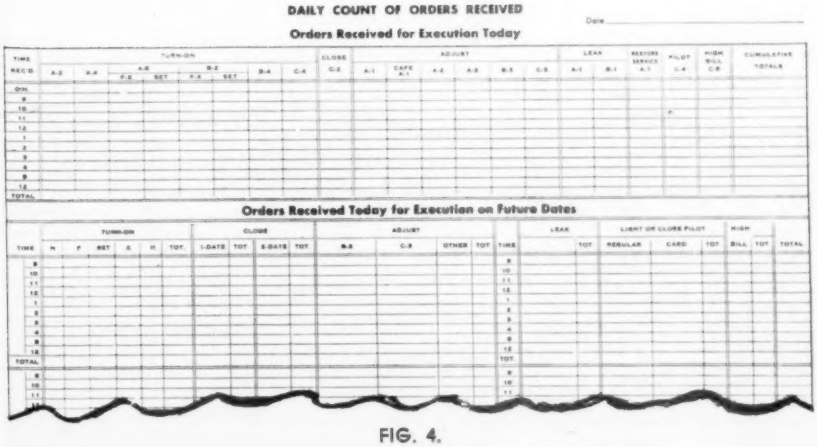
DAILY COUNT OF ORDERS RECEIVED
Orders Received for Execution Today
Orders Received Today for Execution on Future Dates

FIG. 4.

Routing Futured Orders to Servicemen

Generally speaking, there are three types of routes that our servicemen work:

1. **Phone routes.** These routes are set up to handle the same-day orders, i.e., those orders received, dispatched, and completed on the same day. Servicemen on these routes receive all orders over the telephone from the dispatch unit.

2. **Basic routes.** These routes are set up in the dispatch office the night be-

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fore the day of execution. Normally enough orders are given to each serviceman on these routes to keep him busy all day. Should he run out of work, he calls the dispatch unit for additional orders. If he cannot reach all orders, he notifies his dispatcher and the orders are re-dispatched to a "phone" route. Training and testing routes are similar to the basic routes in that a full day's work is given to the men in the morning.

3. **Semi-basic routes.** Servicemen on these routes are given about half a day's work at the beginning of the day. When this work is completed, the men get orders from the dispatch unit over the telephone. This permits a large volume of orders to be worked on a "same day" basis with a minimum number of telephone calls to the dispatcher. It also permits grouping of orders to reduce driving time.

Dispatching of Orders for Basic Routes

Customer requests for a future date are accumulated in the dispatch office until the night before the day of execution. During the night the order routing clerks take over. From a list of servicemen who will be present at all the bases on the following day, the routing clerks prepare the complete routes for each serviceman having a basic route and portion of each semi-basic route.

In order to route these orders in an equitable manner and to assure that the orders will be completed, some method had to be determined that would weigh the various types of service requests properly. Our company uses what is call "dispatch points." All servicemen on basic routes are dispatched with approximately 38 dispatch points of work. In addition, each route has mileage points to cover the necessary driving time. Each point is equal to 10 minutes.

As an example, an order to turn on the gas when the meter is off is worth 2 points or 20 minutes. This time is the typical amount used to work similar orders as determined by the time studies of a large sample.

Points vary according to the season and whether the division is operating on a regular or peak service policy. As these futured orders are received in the dispatch office, a record is kept of each one according to date the service is to be performed and type of service requested in line with the order execution schedule.

As each date of execution arrives, the number of men necessary to do the orders already on hand is deducted from the available manpower. The remaining manpower is available for the same day orders. This is simplifying the process, but it will be discussed more fully later on.

Dispatching Orders for Phone Routes

Orders scheduled for execution on the same day as received are telephoned to the servicemen from the dispatch unit consisting of eight order dispatchers and a lead order dispatcher (Fig. 2). Each dispatcher handles the same day orders for one of central division's eight districts. It is the lead dispatcher's responsibility to see that the load is well balanced in the division as a whole. He receives all the same day orders first and then passes them on to the appropriate dispatcher. If the load becomes heavy in one district, assistance may be obtained from other districts.

Each morning, servicemen having phone routes begin to telephone in. When a serviceman calls, the dispatcher asks him where he is. This location is found by the dispatcher on the drum map in front of him (Fig. 3). This map shows all streets in the sector controlled by that particular dispatcher. The map is mounted under celloloid on an aluminum drum which can be turned easily at the touch of the hand.

After the serviceman's location is found by the dispatcher, he gives the serviceman three or four orders in that general area in order to eliminate excessive driving time. The dispatcher may have more than three or four orders available. In order to have the necessary coverage for emergency orders requiring execution within two hours, it is desirable to have specified servicemen phone in every hour or two. These additional orders will be given to the next serviceman who calls. Another feature of the dispatch unit is the radio equipped trucks.

Under normal operations, these trucks handle orders in the same manner as the serviceman contacted through regular public telephones. In times of emergency they are always on hand. They may be used, as they have often in the past, as emergency headquarters in disaster areas.

Mechanics of the Dispatch System

As stated before, the phone routes and part of the semi-basic routes are used for the satisfaction of customer requests to be performed the same day the order is received. About 30 percent of orders received are "today" orders. In order to do this, orders must be telephoned to the servicemen. This is the job of the dispatch unit.

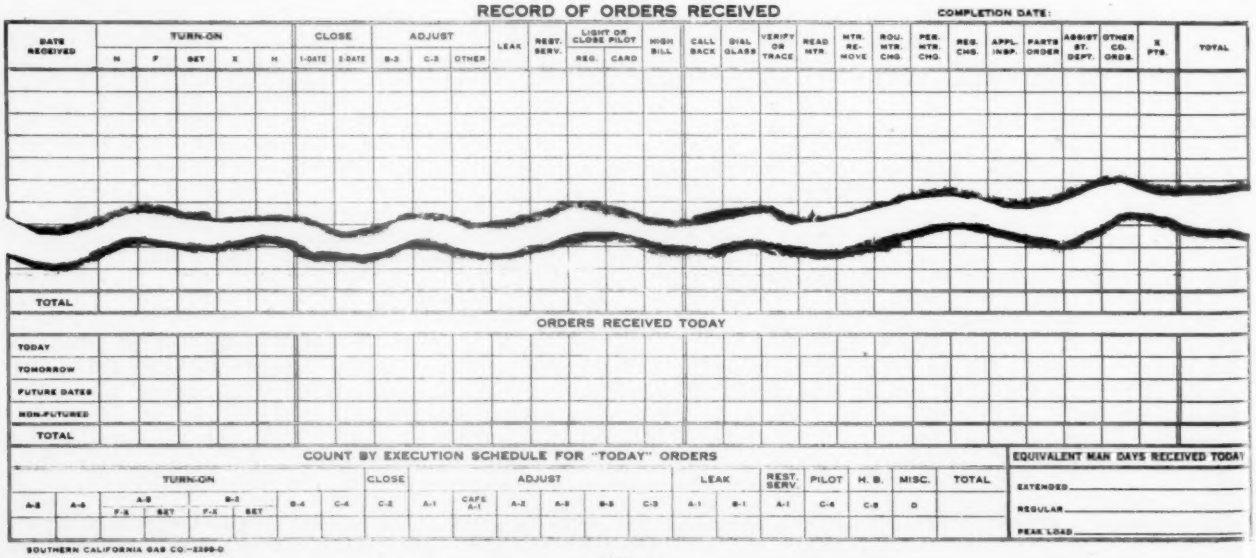

FIG. 6.

CUMULATIVE RECORD OF MAN-DAYS ORDERS RECEIVED — MAN-DAYS WORK FOR FUTURE DAYS — DATE _____

	ORDERS (Man-Days)		Est. of M/D of Orders		ORDERS (Man-Days)		ORDERS (Man-Days)		ORDERS (Man-Days)		ORDERS (M/D)		CUMULATIVE COUNT ORDERS (Man-Days)		
	S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2	TOTAL
On Hand at 8:00 AM															
On Hand at 9:00 AM															
On Hand at 10:00 AM															
On Hand at 11:00 AM															
On Hand at 12:00 N.															
On Hand at 1:00 PM															
On Hand at 2:00 PM															
On Hand at 3:00 PM															
On Hand at 4:00 PM															
On Hand at 12:00 M															
Misc. Orders Disp.															
Man-Days Available													TOTAL ORDERS		

D-222 FOM/eg Rev. 2/24/54

FIG. 7.

ORDERS ON HAND FOR FUTURE DATES
HOURLY COUNT OF ORDERS RECEIVED

Date: Time: Work Schedule:

Type Ord.	Ord.	M/D	Ord.	M/D	Ord.	M/D	Ord.	M/D	Ord.	M/D	Ord.	M/D
Turn-On												
Close												
Adj												
C-3 Adj.												
Leak												
S.L. C.P.												
High Bill												
Misc.												
Total												

Futured Orders on Hand ____ M/D ____

Non-Futured Orders on Hand ____ M/D ____

Total Orders on Hand ____ M/D ____

Basic Routes ____

D-14 Recut 2-28-56 FOM:H

FIG. 8.

Mechanics of the system are:

Nearly all same-day orders come through the telephone service bureau, either as a result of direct calls from customers or as a result of orders taken in the branch offices of the division. These orders arrive in the office of the dispatch unit along with the futured orders. At this point a clerk keeps count of all orders for all days.

These basic counts are kept on our Form 2350-D, *Daily Count of Orders Received* (Fig. 4). This form breaks down the various types of orders and, in some cases, a further breakdown is made in accordance with the work evaluation (dispatch points).

As an example, under turn-on in the lower portion of the page there are five different segregations, namely **N, F, Set, X,** and **H.** These codes indicate the status of gas service (on, off, etc.) and are determined from the information received from the customer by the order receiver.

For example, if the customer states the gas is on, this order is counted under **N.** On such an order it is necessary for the serviceman only to read the meter and possibly get the necessary information for opening the new account.

If the gas is off, this is recorded under **F** which indicates that it will be necessary for the serviceman to enter the premises and inspect and light all equipment. Such an order requires considerably more time for a serviceman.

X indicates that the customer does not know whether or not the gas is on. Through past records we have been able to establish the ratio of such cases on which the gas is actually found off or on and therefore we have been able to establish a definite work allowance time.

Set indicates that the premises have not been served with gas previously and that a meter will have to be installed as well as the usual servicing of all gas appliances.

H indicates a seasonal turn-on where gas is used for heating only.

This breakdown may be adjusted in any manner which would fit into the service policy of any company.

Counting of the orders is a continuous process facilitated by the use of clicker counters (Fig. 5). At the end of each hour, the totals are posted to Form 2350-D (Fig. 4). At the end of the day, this form will show the total number of orders by each type received hourly and by date of appointment made with the customer for the work to be performed.

This information is then posted to

DAILY AVAILABILITY RECORD

DATE _____

DISTRICTS	TOTAL REGULAR MEN		EXT MEN		MIN SCH. DAY OFF		MIN VAC.		MIN OFF DICK		MIN MEN PERS.		NET MEN AVAIL.		12 M TO 8 P.M.	4 P.M. TO 12 MID.	12 MID. TO 8 A.M.	TRNG RTES		TEST RTES		REM RTES		ST. DEPT. JOBS		APT. HSE. CREW		OTHER		P A R T S	R E D T.	PHONE RTES.		SEMI PHONE RTES.		SEMI BASIC RTES.		MEN AVAIL. BASIC RTES.		M/D AVAIL. BASIC RTES.		BASIC RTES. MADE		MEN ON PMC.	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S1	S1	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S1	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
BELVEDERE																																													
BEVERLY HILLS																																													
EAGLE ROCK																																													
HOLLYWOOD																																													
HUNTING. PARK																																													
JUANITA																																													
SLAUSON																																													
36TH STREET																																													
INDUSTRIAL SERV.																																													
TOTAL																																													

ABSENTEES

DISTRICT	NAME	REASON	ONE DAY	FUR NOT

SCHEDULED DAY OFF

DISTRICT	NAME

INFORMATION FOR ROUTING CLERKS

DISTRICT	NAME	INSTRUCTIONS

SOUTHERN CALIFORNIA GAS CO.—2360-H

FIG. 9.

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Form 2298-C (Fig. 6), *Record of Orders Received*. It will be noted that this form, while being very similar to Fig. 4, also allows space for recording internal company orders. In other words, there is a form for each day of the year. The date, shown in the upper right-hand corner, indicates the day on which the orders are to be worked. Dates on the left side of the sheet indicate the day the orders were received.

Each day, therefore, the totals from Fig. 4 are posted on this form on as many dates as are necessary. Thus, it is possible to look ahead and determine the exact number of service requests on hand for any particular day.

At the beginning of each day, the number of orders for the next several days (depending upon conditions) are totaled from Fig. 6 and converted into equivalent manpower required to work them. Conversion factors used are based on time studies and dispatch points previously discussed. In order to make this conversion rapidly, various factors have been weighed so that by applying one factor it is possible to convert any given number of orders of a particular type to equivalent man-days required to work them.

As an example, on the basis of time studies, 97 turn-on orders are equivalent to approximately 5.5 man-days. After these orders have been totaled for the next several working days and converted to equivalent manpower required, they are posted to Form D-222 (Fig. 7), *Man-Days Work for Future Days*. It will be noted on Fig. 7 that the count of man-days work on hand is broken down to **S-1** and **S-2**. This designates the two classifications used for servicemen in this company. In other words, Serviceman No. 2 works only on the simpler type of requests.

With these starting counts properly posted at the end of each hour, the hourly totals, as accumulated on Fig. 4, are posted to Form D-14 (Fig. 8). These counts of orders are then converted to equivalent man-days and added to the count shown on Fig. 7. Through the use of a set of percentages established from past records, it is possible to determine from the rate of orders received up to any given hour during the day, the approximate number to be received during the entire day.

Method used to determine these percentages is: Hourly totals for each day of the week are gathered for a period of at least a year for the basic data. From this data an average percentage is determined for the designated hours for each day which indicate the percent of the total orders of that day on hand each hour. Since the basic data was set up, spot checks have been made twice a year to determine its continued accuracy.

This "estimated number of orders" is then converted to equivalent man-days required and is shown on Fig. 7, under *Estimate of Man Days of Orders for Day*. (Column 2). This process is continued each hour for the balance of the day. This estimate is then compared with the man days available shown at the bottom of the top portion of Fig. 7 to determine the balance between manpower required and manpower available.

In order to make a proper comparison, it is also necessary to maintain a very accurate record of manpower available for any given day. This is affected by vacations, absenteeism, special assignments not reflected in customer requests, off-hour coverage, etc. This information is accumulated for each district on Form 2540-G, *Daily Availability Record* (Fig. 9).

If, in comparing the estimate of manpower required against the manpower available on Fig. 7, it is found that the proper balance is not being maintained, Form 1965-1G, *Order Execution Chart* (Fig. 10) is used. This order execution schedule shows all the various types of requests in the first column with the normal execution time in the middle column. Each order receiver has one of these forms available, and if there are no deviations in-

ORDER EXECUTION CHART
NORMAL WORKING DAY

Effective After _____ / _____
Time Date

Effective on above date only.

To _____

Time of telephone request or delivery of form _____

Issued by _____

Original request ☐ Confirmation of telephone call ☐

Type of Order	Normal Execution Schedule	Deviations from Normal Execution Schedule
A-1 Inoperative Equipment (Commercial) Hazardous Leak Fire or Explosion Asphyxiation Customer Can't Close Appliance (Hazardous) (Other conditions, which in the opinion of the Order Receiver create a definite hazard, may be included in this schedule; however, in such cases, "A-1" should be marked in red on the face of the order.)	Two hours from receipt of order by the Customer Service Department	
A-2 No Gas (Entire Premises) Meter Closed in Error Customer Can't Close Appliance (Non-Hazardous)	Same day order received	
A-3 Air Conditioning, Gas Engine, and Industrial—Inoperative No Refrigeration (Inoperative) No Hot Water (Relight or Inoperative) Heating Appliance (Relight or Inoperative) Noisy Meter or Regulator	Before 5 p.m.—customer's choice. After 5 p.m.—* 1st preference—next calendar day. 2nd preference—today.	
A-4 Turn-On, Bills Paid Turn-On, Promise to Pay Turn-On, Collect	Before 5 p.m.—customer's choice. After 5 p.m.—next calendar day.	
A-5 Turn-On, Call Again	Before 3 p.m.—customer's choice. After 3 p.m.—next calendar day.	
B-1 Minor Leaks and Odors (Noticed when appliance burning or over a long period)	Before 3 p.m.—customer's choice. After 3 p.m.—next working day.	
B-2 Turn-On, Gas Off or Unknown Meter Set, Turn-On (M.S.A. Installed)	Before 2 p.m.—Customer's choice. After 2 p.m.—next working day. (Next calendar day, if customer has moved in or has small children or illness.)	
B-3 Poor Pressure (All appliances) Relight Pilot (Except A-3 Orders) Inoperative Appliance (Except A-3 Orders and Commercial Equipment) Delayed Ignition Telephone Read (Customer leaving town)	Before 1 p.m.—customer's choice. After 1 p.m.—next working day.	
B-4 Turn-On, Gas On	Next working day.	
C-1 Meter Set, Turn-On (No M.S.A.)	Second working day. (M.S.A. installation by Street Dept. to be requested for next working day. Hardship cases may be specialed for completion of both M.S.A. installation and turn-on for next working day.)	
C-2 Close Orders	Show both date requested and last day order may be executed up to three working days from date order taken. If customer insists on earlier execution, follow procedure described on the reverse side.	
C-3 Adjust Appliance (Residential and Commercial) Company Orders Affecting Quality of Service Investigate Routine Parts Replacement Special Reading	Next working day. After 3 p.m.—eliminate today specials.	
C-4 Light Pilot (Seasonal) Close Pilot Turn-On Only (Seasonal)	Next working day. After 3 p.m.—eliminate today specials.	
C-5 High Bill Investigation Adjust Appliance — Air Conditioning, Gas Engine, Industrial	Next working day.	
D-1 Verify Occupancy (Meter Registration or Zero consumption) Increase in consumption	Second working day. Avoid Mon's & Fri's. (Increase in consumption should be scheduled as A-1 if a hazardous condition appears to exist.)	
D-2 Read Meter (7 Days) Routine Parts Replacement (7 Days) Check Servel for Maintenance Agreement (7 Days) Decrease in Consumption (14 Days) Trace and Tag (14 Days) Verify House Number, Meter Number, etc. (14 Days) Remove Meter Broken Dial Glass Company Order not Affecting Service Periodic Meter Change	Second working day if an appointment is to be made with customer. (Avoid Mon's & Fri's.) If order can be executed without entering building, or if no appointment is made with the customer, no execution date should appear under "Complete-on." These latter orders will be dispatched as fill in. The number of days in parentheses (Group D) indicates the maximum of calendar days the Customer Service Department will hold an order before dispatching it when no appointment is indicated.	

*See paragraph 5 under General Information on reverse side.

REMARKS _____

FIG. 10.

dicated in the right-hand column, an appointment will be made with the customer in accordance with the information shown in the middle column.

To maintain the proper balance and still be able to make a definite date with the customer at the time the request for service is made, it is necessary for the dispatch office to control the making of these appointments. This is accomplished by indicating in the right-hand column the date on which the appointment should be made for each particular type of order if it is to deviate from normal.

Urgency of the service requested is indicated by the position on the chart with those most urgent at the top. For example, **A-1** and **A-2** orders do not have space for deviations because this type of service is rendered at any time by our company. If it is noted, by scrutinizing Fig. 7, that too much work is

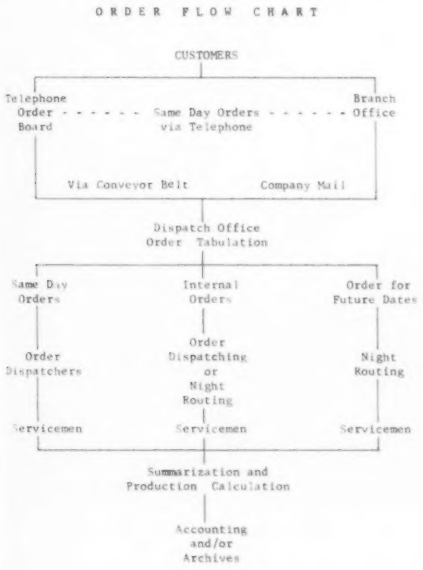

FIG. 11.

on hand for a particular day, the dispatch office will determine to what day the work should be deferred and will issue these instructions to the various receiving offices. As much as possible, this balancing is accomplished by deferring the type of orders which will cause the least inconvenience to the customer.

Use of Internal Orders

On days when the customer request load is light, the dispatch office makes heavy use of internal orders to balance the load. Most of these consist of the periodic meter changes required by the California Public Utility Commission. These changes are made after the meters have been in continuous service for a period of 10 years.

Processing of Completed Orders

When various types of orders are dispatched to the field, servicemen attempt to complete them. At the end of each day, the orders are sent back to the dispatch office from the districts. In the dispatch office, the orders are classified and tallied in various groupings for the individual servicemen, the district and the division. The following indicates, generally, how completed orders are segregated.

Basic Requirements

A record is kept of all calls made on the customer's premises and of the employee making the call. This record is retained for three years. We are presently using a microfilm record of all orders completed by the servicemen. The orders come in from the bases segregated according to servicemen along with each man's time sheet. These are all sent through the machine consecutively according to the base so that all work is in order.

Daily count is maintained of completed orders by principal types. A monthly recapitulation and report is submitted to the operating manager of the department.

Daily reconciliation is made of the orders worked and the time charged. This is done to assure accuracy of the records and accounting. This is done by inspecting the orders to see that the proper accounts have been charged on the serviceman's time sheets and that the orders worked and the time charged are compatible for purposes of calculating production for each serviceman.

Every month the number of completed orders by principal types is converted into hours for reporting purposes to the Public Utilities Commission. This is done by applying standard hours by type of work performed.

All orders are reviewed for accuracy and completeness. Each day a calculation of the standard work produced by each serviceman is made. Each month a divisional report is made. To do this *Production Calculation Charts* are supplied by the standards section for use in calculating servicemen's standard work produced.

As required by the quality control section, the dispatch office will select the orders requested for the specified serviceman whose work is to be checked.

Order Classification

For production calculation and order count purposes, orders are divided into four groups, which are further divided.

1. **Customer Request Orders:** These include turn-ons and turn-offs, adjust appliance requests, leak investigations, etc.

2. **Internal Orders:** These orders are defined as orders issued within the company to render service to the customer to comply with company policy or resulting from a previously completed customer request order and requests from other departments. These include sales orders under the company's parts replacement program, school surveys, restaurant inspections, etc.

3. **Original Meter and Regulator Orders:** These include periodic meter changes as required by the Public Utilities Commission, meter removals, replacement of dial glass, change of regulator, etc., all as independent assignments.

4. **Incomplete Order:** Any order called on but not completed because the customer was not home (C.G.I.), wrong address, duplicate order, cancellation, customer not ready, etc., is an incomplete order. These are separated into customer request orders, sales orders, periodic meter changes, and all others.

5. **Incidental Meter and Regulator Work:** Work on meters or regulators that is not the primary assignment of the original order is considered "Incidental Meter and Regulator Work."

All orders are classified, counted, and evaluated in accordance with these standard order definitions for production calculation purposes.

Work unit values for completed calls, incidental items, driving and office time and telephone calls or calls at the office are shown on the *Production Calculation Chart*, furnished by our standards section twice yearly — in May for summer values and in October for winter values. Values are based on the average time taken to complete an adequate sample of each type of order. Each district has its own production values because conditions vary from district to district. Our production values are in units of five minutes.

For example, from a time study analysis it is determined that an average serviceman at our Belvedere Base takes 20 minutes to turn the gas on and enter the premises to light and service the appliance. Therefore, for every "turn-on entered" order completed by a Belvedere serviceman he will receive 4 points. As a result, during a regular eight-hour day a serviceman could possibly accumulate 96 points plus points allotted for mileage driven.

It is a simple matter to convert these production values to a figure indicating hourly production. Total points are multiplied by five (minutes) and the result is divided by the number of hours worked on orders. The company attempts to keep this hourly value to 60 or above, while still maintaining high quality.

Part 4 of this four-part discussion will appear in the next issue of American Gas Journal. ★ ★ ★

Ohio Oil's Kenneth Burns, Manager, Procedures Research and Machine Accounting Division, examines payroll data tape.

How private line teletypewriters send data to fill out 6500 Ohio Oil pay checks

Payroll information on The Ohio Oil Company's 6500 employees comes into Findlay, Ohio, headquarters by private line teletypewriter service from ten distant locations as far west as California: six production and two marketing points, one refinery, and the research center in Denver.

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Gas Calorimetry

Part 2 — Total Heating Value Calorimeters

Calorimeters are instruments in which the heating value or heat of combustion of a fuel gas is determined. Since accurate determination of heating value is of primary importance to the gas industry, it is desirable to have a general idea of the operation of various types of calorimeters in use or tried in making such measurements.

First step in such a study is to classify the types. A variety of groupings can be made, but the following will serve best to illustrate the fundamental measurements involved:

I. Total heating value types: This includes those instruments used to make a direct determination of total heating value. They also employ principles of operation that conform quite closely to the conditions outlined by the definition of total heating value. Some of the most important examples are as follows:

A. Water-flow calorimeters,
   1. Manually operated,
   2. Continuous automatic recording.
B. Recording calorimeters.
C. Regnault and Julius Thomsen types.
D. Bomb calorimeter.

II. Net heating value types: This class is represented by a variety of principles of operation, but in general the indication is related to net heating value although results may be given in total heating value. Examples of this group include,

A. Thermeter.
B. Sigma calorimeter.
C. A variety of instruments that depend upon the indication of some thermometric device, which may be thermoelectric or may depend upon the expansion of a solid, liquid, or of a gas.

III. Inferential types: In this classification are found instruments of the comparison type and those that depend upon some other characteristic, such as appearance of a flame, specific gravity, or gas analysis. Typical examples are as follows:

A. Parr calorimeter.
B. Caloroptic.
C. Gas analysis,
   1. Absorption method,
   2. Mass spectrometer.
D. Specific gravity instruments.

Obviously, detailed descriptions of each type instrument in these three groups is beyond the scope of this series. However, a brief description of types presently in use or which are of historical interest is given. In addition to the principle of operation, some important characteristics or limitations will be considered.

On the basis of the end use of the heating value measurement, a number of essential features or characteristics of any gas calorimeter can be stated. Some of these are listed as:

1. Accuracy,
2. Reliability,
3. Time to secure result – time lag,
4. Continuous automatic recording or manual,
5. Calculations required,
6. Skill required to operate,
7. Installation requirements,
8. Maintenance requirements,
9. Calibration,
10. Cost.

Other items could be added to this list, but these are of primary importance.

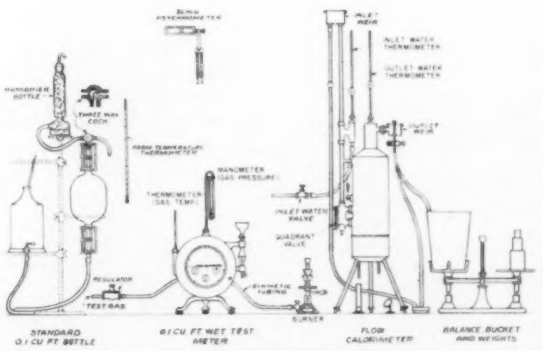

FIG. 3. American flow calorimeter assembly.

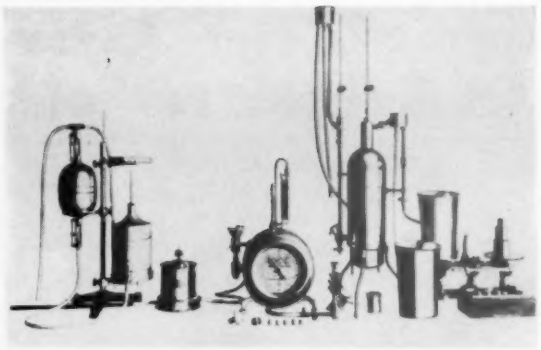

FIG. 4. Sargent (Precision) flow calorimeter.

Water-Flow Calorimeter — Manual

This type of calorimeter is represented by a number of instruments that are similar in general operating principles but differ in various details. Fig. 3 shows the assembly of an American flow calorimeter. Illustration shows the calorimeter proper — marked "Flow Calorimeter" — and the associated equipment involved in accurate determination of heating value. The other example of this type, which is widely used in this country, is the Precision flow calorimeter shown in Fig. 4.

In the flow calorimeter, heat to be measured is imparted to a stream of water; the mass of water flowing through the calorimeter – during the time that a known mass or volume of the combustible is burned within the calorimeter and the resulting change in temperature of the water — furnishes data necessary for calculating heat imparted to the water.

This principle may be expressed as an equation:

$$\text{Observed Heating Value} = \frac{(\text{temp. rise})\ (\text{lb of water heated})}{(\text{cu ft of gas burned})\ (F)}$$

The equation gives an approximation of total heating value, neglecting variations due to heat losses, loss or gain of heat due to loss or gain of water over that formed in combustion, and the minor variation due to variation in specific heat of the water.

During operation of the calorimeter, test gas flows through a regulator (Fig. 3), which maintains a uniform rate of flow and then goes to a wet test meter. The meter is equipped with a thermometer for indicating gas temperature and a manometer to show gas pressure. From the meter, gas is delivered to a special burner provided with the correct orifice for the gas being tested. In operation, the burner is inserted into the calorimeter in proper position within a nearly closed chamber, called the combustion chamber.

A steady flow of water, maintained at a constant temperature in an overhead storage tank, enters the intake tube and flows past the bulb of the inlet water thermometer and to the inlet water weir. From the connection to the weir, water also flows through the indicating quadrant valve, which is used to set rate of flow. Water then passes into the water-circulating ring which insures a uniform supply to all parts of the heat exchanger.

From this circulating ring, water passes upward into the outlet-water thermometer housing, through the baffle structure and by the outlet-water thermometer bulb and then to the outlet-water weir. From here water flows to a three-way valve, permitting delivery to the drain or weighing bucket.

Thus, temperature of water entering and leaving the calorimeter is measured by inlet and outlet-water thermometers respectively. Water flows through the calorimeter under pressure determined by the difference in level of the inlet and outlet overflow weirs. Rate of water flow, and hence its temperature rise, may be varied by the quadrant valve.

While gas is burning in the combustion chamber, air required for the combustion enters this chamber through the open bottom of the calorimeter. The heated flue products rise to the top of the water-jacketed combustion chamber and are deflected downward through the heat exchanger tubes. The heated gaseous products are made to impart to the water flowing through the calorimeter nearly all the heat resulting from combustion of the test gas.

Circulation through the instrument is induced by heated products of combustion. Flue gases pass from the lower end of the heat exchanger tubes into the products chamber, from which they flow past a flue gas thermometer and thence to atmosphere through the damper.

Water formed by the combustion condenses in the heat exchanger tubes and flows into the products chamber from which it is discharged through the condensate drain tube.

From the foregoing description, it can be seen that in the water-flow calorimeter, combustion takes place at *constant pressure*, and the temperature of the flue gases is reduced to nearly that of the inlet water. Practically all water formed by combustion is condensed to the liquid state. As a result, the instrument permits a direct determination of total heating value.

Total heating value of the test gas must, of course, be calculated from data obtained during a test run. Suitable corrections to many of the observations must be made. Observed heating value can then be calculated from the formula given previously. From this value, final total heating value is obtained by making corrections for heat losses, for effect of atmospheric humidity, and for variation of the specific heat of water.

Operation of the water-flow calorimeter requires considerable skill and knowledge of the instrument and probable sources of error in order to secure precise results. ASTM Standard D900-55 contains the following requirement on reproducibility of results. *The maximum permissible difference between the results of duplicate determinations of calorific value of a given sample of gas by the same observer using a single set of apparatus is 0.3 percent. The maximum permissible difference between results of determinations of calorific value of a given sample of gas by different observers using different apparatus is 0.5 percent.* This statement gives some indication of probable accuracy when the instrument is operated by a person skilled in the art.

Most important correction that must be made to the observed heating value when using the instruments as shown in Fig. 3 and 4, is for the *latent heat of vaporization* of that part of the water formed by combustion that is carried off as vapor in the flue gases. This is the so-called *humidity correction* and is the result of the fact that the combustion air normally enters the calorimeter only partially saturated.

A modification of the instrument has been made that provides a humidity and temperature controller to condition the combustion air to the value of relative humidity, which will greatly reduce or practically eliminate the humidity correction.

A detailed study of the operation of the water-flow calorimeter will show that installation and mainte-

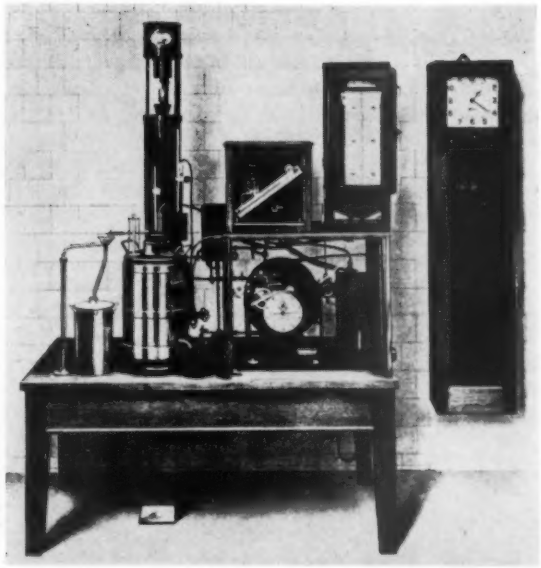

FIG. 5. Fairweather recording flow calorimeter.

nance requirements must be given careful consideration if the best accuracy is desired.

Water-Flow Calorimeter — Recording

One of the limitations of the manual water-flow calorimeter is the time required to secure a measurement of heating value. Importance of the measurement to the industry makes a continuous recording instrument most desirable. In Great Britain, a modification of a non-recording water-flow calorimeter (Boys type) to a continuous recording instrument has been developed. Fig. 5 shows the instrument, which is called a Fairweather recording calorimeter. Essentially, it is a water-flow calorimeter in which there is automatic control of water and gas flows and continuous correction for changes in atmospheric temperature and pressure.

British publications report that the drift in accuracy from one week to the next is normally less than 0.5 percent. Absolute accuracy depends, of course, on the condition and accuracy of various measuring elements and most important of all, on room conditions. For example, a room temperature 3 F higher than inlet water temperature should be maintained to minimize radiation losses from the calorimeter and to insure correct air gas ratio for the burner.

If room temperature becomes lower than the inlet water, flow of air to the burner will be erratic and probably reversed, ultimately causing the burner to go out. Control should be of the proportional type, since "on-off" action can set up a thermal oscillation in the calorimeter, causing cyclic variation in the heating value record.

Maintenance and installation requirements appear quite detailed. One important advantage is that a manual test of heating value can be made to check the recorded value. Time lag is on the order of 5 to 6 minutes to start to show the change of a 470 Btu gas and 15 to 20 minutes to reach the final value.

Recording Calorimeter

Most generally used continuous-recording calorimeter in this country is the Cutler-Hammer type. The instrument is a type of flow calorimeter, with the difference that *air is used as the heat absorbing medium instead of water*. This principle makes possible a simpler instrument for continuous automatic recording of heating value, since the gas and heat absorbing air can be maintained readily at a fixed volumetric ratio.

The complete calorimeter consists of two major parts—a recorder that gives the indication and record of the gas heating value, and a tank unit in which actual measurement takes place. The two parts are shown in Fig. 6 and a flow diagram of the tank unit is shown in Fig. 7.

This unit is constructed so that metered quantities of gas and air at the same temperature, pressure, and saturation condition are delivered to, and burned in a burner. Liberated heat from the combustion of the gas is imparted to a separate stream of air. Temperature rise of this air is used as a measure of the heating value. In the burner, flue products are isolated from heat absorbing air and are cooled down substantially to the initial temperature at which the gas and air were metered. Water formed in combustion is condensed to the liquid state. Consequently, the calorimeter makes the measurement of heating value substantially in accordance with the definition of total heating value given previously.

Temperature rise of the heat absorbing air, and therefore, the reading of the calorimeter, is substantially independent of barometric pressure changes, but is affected by tank temperature. The fact that both the volume of gas and heat absorbing air are affected in like manner by barometric pressure changes makes the reading independent of this factor.

Although volumes are also affected by changes in temperature in a like manner, in the volume of gas the water vapor displaces combustible gas, while in the heat absorbing air, it merely substitutes a slightly lower specific heat material, water vapor, for air. As a result, an increase in tank temperature reduces temperature rise.

Since the calorimeter must be independent of this variation, at least for a reasonable range in temperature, compensation is provided by making the thermometers of nickel wire, which has a resistance vs temperature characteristic that follows a second degree equation. The change in ohms per degree rise value of these thermometers is such that it substantially counteracts the change in temperature rise and

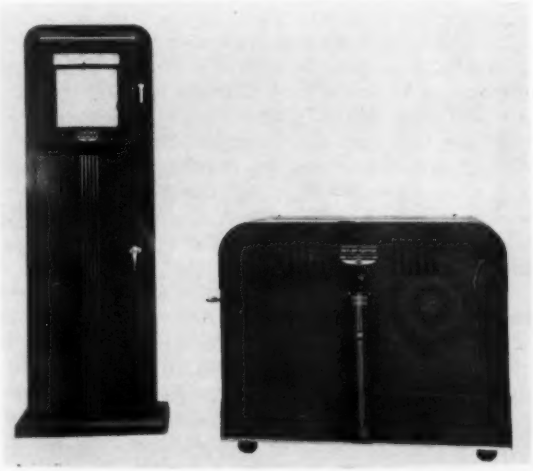

FIG. 6. Recording calorimeter.

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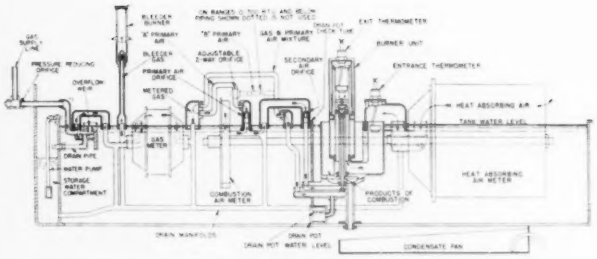

FIG. 7. Flow diagram of calorimeter.

produces a resistance difference that is essentially independent of tank temperature variations over the normal tank temperature operating range of 60 to 90 F.

Although the design used results in only small overall errors in the temperature range from 60 to 90 F, other factors contribute to the error in reading when operating at a stable condition within this range, so that it is desirable to air condition the calorimeter room if the maximum accuracy is desired.

The recorder translates the temperature rise of the heat-absorbing air into an indication and record of the test gas heating value. A self-balancing Wheatstone bridge is used with the resistance thermometers for this purpose. Scale and chart are both calibrated in Btu per cubic feet and require no corrections or computations to give the results at the design basis of measurement. Ranges available cover heating value measurements from blast furnace gas to butane vapor. The lowest range instrument has a usable scale from 70 to 120 Btu and the highest range is from 1800 to 3600 Btu.

In certain ranges, two types of scale and chart combinations are available. For example, to measure the heating value of natural gas of approximately 1000 to 1060 Btu, a range of 0 to 1200 Btu is available. One type has a scale and chart that has essentially uniform graduations from 0 to 1200 with a usable guaranteed portion from 600 to 1200 Btu. The other type has a considerable portion of the range suppressed into a small section of the scale and chart and the top 25 percent of the range is covered by approximately 85 percent of the total scale and chart. This expanded range instrument, for the case being considered, would have an operating range from 900 to 1200 Btu. This permits much smaller scale divisions with a corresponding increase in readability and some increase in accuracy. Another expanded range is available with a 1200 and 1500 maximum value with the top one third of the range covered by approximately 85 percent of the scale and chart. This provides the 800 to 1200 Btu and 1000 to 1500 Btu ranges.

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A special model of the instrument is available for measuring the heating value of premix gas-air mixtures (95 to 110 Btu). Wide industrial use of gas mixtures containing sufficient air for combustion (premix gas) make this form of the instrument of special value. The process of producing the premixture has a number of very critical problems. The ability to measure the heating value of the product and detect changes so that the pre-mixing equipment can be maintained in proper operation is important. Modifications to the tank unit are relatively simple to permit proper combustion at the bleeder burner and in the main burner of a gas which has already been mixed with sufficient air for combustion. The bleeder gas is enriched with straight gas to prevent flash back. The pressure reducing inlet orifice is designed to prevent a flash back from transmitting to the sample line. The burner unit gas tube is made of stainless steel to give proper operating life.

Thomsen Type Calorimeter

This Thomsen-type calorimeter has a combustion chamber within the calorimeter in which gas is burned and products of combustion give up their heat by being passed through a coil immersed in the water of the calorimeter.

Bomb Calorimeter

Calorimeters previously described have at least one characteristic in common — *combustion of the gas sample takes place at constant pressure.* This is one of the conditions prescribed in the definition of heating value. In the bomb calorimeter, combustion takes place at constant volume and suitable corrections must, therefore, be applied (dependent upon the change of volume occurring in combustion at constant pressure) to reduce the results to values that correspond to heating value determinations at constant pressure.

A bomb calorimeter consists of two major parts — a bomb, in which combustion takes place at constant volume in the presence of sufficient oxygen to insure complete combustion, and a specially designed calorimeter in which the bomb is located. The calorimeter vessel is placed in an enclosure surrounded on all sides by a constant temperature water jacket.

Temperature changes of water in the calorimeter surrounding the bomb are measured by means of a calorimetric platinum resistance thermometer and a special Wheatstone resistance bridge capable of measuring small temperature changes to one or two ten-thousandths of a degree.

Although precise results may be obtained, the equipment involved, the procedure required, the calculations necessary to obtain results, and the computations to express the results in terms of total heating value, limit this instrument to academic and certain research laboratories. It is not a device that satisfactorily meets the gas industry's requirements for the usual determination of gas heating value.

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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY

JANUARY 1958

Outlook Issue — Forecast of industry expansion plans for 1958. Views and comments of gas utility industry top executives and leaders. Review of 1957 operations.

Here's a resolution you'll find helpful to keep. File the conveniently perforated AGJ "Fundamentals" series.			1 NEW YEAR'S DAY	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23 Public Utilities Adv. Assn. San Francisco	24	25
26	27	28	29	30	31	

FEBRUARY 1958

American Gas Journal is the only publication edited exclusively for the operating, engineering and management men in the Gas Distribution Industry.						1
2	3	4	5	6	7	8
9	10	11	12 LINCOLN'S BIRTHDAY	13	14	15
16	17	18	19	20	21	22 WASHINGTON'S BIRTHDAY
23	24	25	26	27	28	

MARCH 1958

March Issue will highlight corrosion prevention — materials and equipment used — new methods of combating corrosion.

2	3	4	5	6	7	1 / 8
9	10	11	12	13	14	15
16	17 ST. PATRICK'S DAY	18 National Association of Corrosion Engineers — San Francisco	19	20 NEGA—Boston	21 NEGA—Boston	22
23	24 Midwest Gas Assn. Colorado Springs	25 Midwest Gas Assn. Colorado Springs	26 Midwest Gas Assn. Colorado Springs	27 Okla. Utilities Assn. Oklahoma City	28 Okla. Utilities Assn. Oklahoma City	29
30	31 GAMA—White Sulphur Springs					

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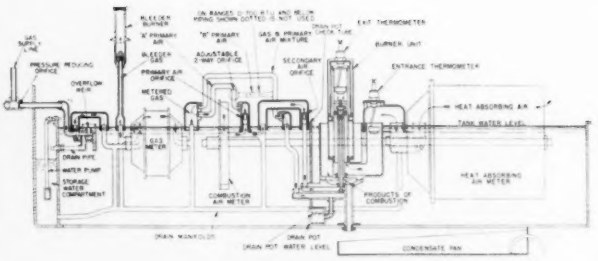

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1958

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
APRIL 1958						
		1 GAMA—White Sulphur Springs	2 GAMA—White Sulphur Springs	3	4	5
	7	8 AGA Ind. & Comm. Milwaukee	9 AGA Ind. & Comm. Milwaukee	10 AGA Ind. & Comm. Milwaukee	11 Indiana Gas Association French Lick Indiana	12
	14	15 SW Gas Meas. School, Univ. of Okla.	16 SW Gas Meas. School, Univ. of Okla.	17 SW Gas Meas. School, Univ. of Okla.	18	19
	21 AGA Research & Utilization — Cleveland	22	23	24	25	26
	28 SGA—Dallas	29 SGA—Dallas	30 SGA—Dallas			
MAY 1958				1	2	3
	5 AGA Distribution-Engineering-Transmission Conference, New York	6	7	8	9	10
	12 AGA Eastern Sales Conf. New York City	13	14	15	16	17
	19 AGA Midwestern Sales Conf. — Chicago	20 Pennsylvania Gas Association, Pocono Manor	21	22	23	24
	26	27	28	29 MEMORIAL DAY	30	31
JUNE 1958	2	3	4	5	6	7
	9	10	11	12	13	14
	16	17	18	19	20	21
	23 Michigan Gas Assn. Mackinac Island	24 Canadian Gas Association — Murray Bay, Quebec	25	26	27	28
	30					

Southern Gas Association Convention Issue — salutes the progressive SGA on its 50th Anniversary
Editorial features engineering, operations developments in gas utility industry.

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Sulphur Springs

1958

JULY 1958

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
AGJ BEGINS 100TH YEAR OF PUBLICATION!		1	2	3	4 INDEPENDENCE DAY	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST 1958

How many persons are borrowing your copy of AGJ? Drop a hint that each one can have a personal subscription . . . plus their own individual copy of next month's important AGJ Handbook issue . . . by mailing only $3 now.					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 / 31	25	26	27	28	29	30

SEPTEMBER 1958

American Gas Journal Handbook Issue, September 15th — The Gas Utility Industry's only handbook of engineering-operating data. Called "most frequently consulted reference work in the gas utility industry."

	1 LABOR DAY	2	3 PCGA Annual Portland, Ore.	4 PCGA Annual Portland, Ore.	5 PCGA Annual Portland, Ore.	6
7	8	9	10	11	12	13
14	15 HANDBOOK ISSUE	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	Interested in supervision and management? You'll find practical new ideas in AGJ's "Better Management" series.			

Published as a Supplement to the December, 1957, Issue of

Gas Genie Says...
I'M COOKING UP A SURPRISE FOR YOU - JUST WAIT 'TIL NEXT WEEK! BUT DONT WAIT TO START COOKING WITH A MODERN, AUTOMATIC GAS RANGE. IT'S MAGIC!
PUZZLE: FIND YOUR NEW GAS SERVICEMAN. HE'S JUST JOINED ELIZABETHTOWN CONSOLIDATED GAS COMPANY TO HELP YOU ENJOY THE MAGIC OF GAS!
I'M THE GAS GENIE, FOLKS... COMING TO HELP ELIZABETHTOWN GAS TELL YOU ABOUT THE LUCKY SEVEN-THE SEVEN WAYS THE MAGIC OF GAS CAN HELP EVERY FAMILY!
Gas Genie Says...
MAY I HAVE A DATE WITH YOU NEXT WEEK? I HAVE BIG, EXCITING NEWS FOR YOU ABOUT ELIZABETHTOWN GAS, YOUR HEADQUARTERS FOR THE MAGIC OF GAS!

Typical "teaser ads" in local papers introduced company's newest employee, Gas Genie, to public.

Public Relations at Work . . .

Clever Program Introduces Gas Genie To Elizabethtown Consolidated Customers

John Kean,
Administrative Assistant
Elizabethtown Consolidated Gas Company
Elizabeth, New Jersey

New emblem of company is introduced by the author.

ELIZABETHTOWN CONSOLIDATED GAS COMPANY, which serves more than 140,000 customers in northern New Jersey, recently tied in both appliance and institutional promotion with a publicity and advertising program launching a new company emblem. Helping to introduce the emblem —first to be adopted by the 102-year-old company—was the *Gas Genie*, an Aladdin-like cartoon figure, created by Gene Hazelton.

To build public interest in the new company emblem, the company ran 15 teaser ads over a three-week period in two daily and 12 weekly newspapers, and 15 teaser billboard displays, which were posted a month before the emblem was introduced. Both the teaser ads and the billboards featured the Gas Genie.

Besides serving as "ticklers," the teaser ads were designed to promote friendly gas service and gas appliances, stressing the "magic of gas." First five ads introduced the Gas Genie as a new, friendly employee of Elizabethtown Gas. In the remaining, the Gas Genie, as company spokesman, talked about the "lucky seven ways the magic of gas works for you," the "Burner-with-a-Brain," gas house heating, water heating, clothes drying, and the economy of gas, as well as about the forthcoming announcement of the company symbol.

On the billboards, the Gas Genie alerted the public to watch for news from Elizabethtown Gas.

In the meantime, a consumer booklet, also using the Gas Genie as spokesman was being prepared. In it, Gas Genie welcomes new customers and reminds others that the company is always glad to serve them. It introduces the company emblem and briefly covers appliance and emergency service, home service activities, meter reading and billing, the seven basic residential uses of gas, the AGA Blue Star Seal of Approval, safety tips, and company growth. A map of the company's service area shows commercial office locations, for which addresses and day and night phone numbers are listed. Title and running theme of the eight-page booklet is "*Elizabethtown Consolidated Gas Company . . . At Your Service!*"

Announcement was set to break on Monday, September 16. On Friday, September 13, Elizabethtown held a press luncheon which served several purposes — the company and its employees honored Henry W. Crane, 83-year-old secretary and director of the company, marking his 60th year as an employee. Crane, as senior employee of the company, was introduced to the Gas Genie, who was described as the "newest company employee"; the company emblem was unveiled for both press and employees, and an "oldest stove contest," tied in with promotion of the company's new emblem, was announced.

A six-foot display piece in full color showing the Gas Genie holding the new emblem was unveiled at the moment the guest of honor "met" the Gas Genie.

Members of the press received kits containing the new consumer booklet, a news release, and a pack of playing cards which displayed the new emblem. Photographs taken at the luncheon were made available to the newspapers. The news story with photos ran the following day in both daily papers.

On Monday, September 16, advertising, billboards, and truck cards intro-

Published as a Supplement to the December, 1957, Issue of
American Gas Journal
1958
Calendar

1958

OCTOBER 1958

American Gas Association Convention Issue
Supplements convention program and activities.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4
	6	7	8	9	10	11
2	13 AGA Annual Atlantic City	14 AGA Annual Atlantic City	15 AGA Annual Atlantic City	16	17	18
9	20	21	22	23	24	25
5	27	28	29	30	31 HALLOWE'EN	

NOVEMBER 1958

Why not give your associates the one Christmas gift you know they'll appreciate . . . AGJ subscriptions! Order now, only $3 for each year-long gift.						1
	3	4	5	6	7	8
	10	11 VETERAN'S DAY	12	13	14	15
5	17	18	19 Midwest Gas Assn. — Gas School and Conf. Ames, Iowa	20	21	22
3 / 30	24	25	26	27 THANKSGIVING	28	29

DECEMBER 1958

	1	2	3	4	5	6
	8	9	10	11	12	13
1	15	16	17	18	19	20
	22	23	24	25 CHRISTMAS	26	27
3	29	30	31	Here's hoping you had the best year ever . . . and that AGJ has contributed to your progress.		

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On the billboards, the Gas Genie alerted the public to watch for news from Elizabethtown Gas.

In the meantime, a consumer booklet, also using the Gas Genie as spokesman was being prepared. In it, Gas Genie welcomes new customers and reminds others that the company is always glad to serve them. It introduces the company emblem and briefly covers appliance and emergency service, home service activities, meter reading and billing, the seven basic residential uses of gas, the AGA Blue Star Seal of Approval, safety tips, and company growth. A map of the company's service area shows commercial office locations, for which addresses and day and night phone numbers are listed. Title and running theme of the eight-page booklet is "*Elizabethtown Consolidated Gas Company . . . At Your Service!*"

Announcement was set to break on Monday, September 16. On Friday, September 13, Elizabethtown held a press luncheon which served several purposes — the company and its employees honored Henry W. Crane, 83-year-old secretary and director of the company, marking his 60th year as an employee. Crane, as senior employee of the company, was introduced to the Gas Genie, who was described as the "newest company employee"; the company emblem was unveiled for both press and employees, and an "oldest stove contest," tied in with promotion of the company's new emblem, was announced.

A six-foot display piece in full color showing the Gas Genie holding the new emblem was unveiled at the moment the guest of honor "met" the Gas Genie.

Members of the press received kits containing the new consumer booklet, a news release, and a pack of playing cards which displayed the new emblem. Photographs taken at the luncheon were made available to the newspapers. The news story with photos ran the following day in both daily papers.

On Monday, September 16, advertising, billboards, and truck cards intro-

YOUR FRIENDS AT SPI ALL WISH FOR YOU A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

standard pipeprotection inc.
3000 SOUTH BRENTWOOD BLVD • ST LOUIS 17, MISSOURI

Booklet developed for consumers, outlines company services and points out modern uses of gas in the home.

duced the new emblem to the public. Full page ads—one in three colors—featuring the Oldest Stove Contest *"Welcoming Our New Symbol of Good Gas Service"* ran in the two daily papers on Monday and later in the week in the 12 local weekly papers.

New billboard posters went up on the 16th to feature the new emblem being introduced by the Gas Genie. A brief message invited the public to enter the contest. Truck cards were similar to the billboards.

Featured in the Oldest Stove Contest were five *"Panoramic Sixty"* Tappan gas ranges, to be won by the Elizabethtown customer entering the oldest gas stove in each of the company's five service districts.

A follow-up ad—2 columns by 7-in.—was inserted twice in the dailies and once in the weeklies to remind customers that the contest ended October 4.

On Monday, October 21, an ad announcing winners launched the company's annual "Old Stove Roundup" promotion. A news release and photographs of the winners will go to editors.

The new Elizabethtown trademark, designed by Nesbitt Associates, New York industrial designers, is already in use—in the form of Scotch-Lite stickers on company cars and trucks, on furnace installation inspection stickers, on company stationery and recipe sheets, and in the windows of accredited collection agencies.

The company's objective is to make the distinctive, copyrighted symbol generally recognized throughout its service territory as the *"Symbol of Good Gas Service."* ★ ★ ★

Temperature Compensation of Domestic Meters

H. V. Beck, *Chief Engineer*
American Meter Company
Philadelphia, Pennsylvania

GAS IS AN ELASTIC FLUID whose volume is a function of its temperature as well as its pressure. The effect of these two variables is established, in general, by Charles' and Boyle's Laws. Only by adjusting measured volumes to a base temperature as well as a base pressure can one obtain a true measure of the quantity.

Obviously, the degree of refinement that is warranted in a commercial measurement is dependent upon the cost of that refinement. For this reason, gage pressures, above an assumed average barometric pressure, are used to correct measured volumes — rather than using the more complex and expensive absolute pressure gages in order to apply a more theoretically correct factor.

No pressure correction is applied at all in most domestic gas measurements, except as might be in the rate, since the gas is delivered at a substantially constant gage pressure, above a barometric pressure known to fluctuate within certain average limits. The effect of barometric pressure changes exceeds that of normal fluctuation in gage pressure; however, the effect of barometric pressure changes will average out over a period of time, and it, consequently, can be disregarded.

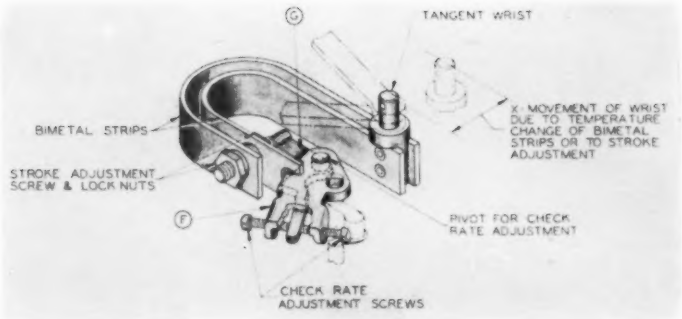
Problem of Temperature

In the same way, the effect of temperature could justifiably be ignored when gas was used only for cooking and domestic water heating, and when it was common practice to place the meter indoors.

The resulting error is not self-compensating, however, when gas is used for space heating where the preponderance is consumed during the winter — and when meter accessibility, or customer demand, requires that the meter be set outdoors.

Since a difference of only 5 F causes a volume change of about one percent, the concern of distribution companies with a large space heating load is real. Where the heating season corresponds to about 5000 to 6000 degree days, annual revenue losses of about five percent can be estimated with a conventional meter set outdoors. This revenue loss in such instances could amount to about $10 per year.

This distinct difference in present operating conditions, compared with those that existed previously, justify


TANGENT WRIST
BIMETAL STRIPS
STROKE ADJUSTMENT SCREW & LOCK NUTS
X MOVEMENT OF WRIST DUE TO TEMPERATURE CHANGE OF BIMETAL STRIPS OR TO STROKE ADJUSTMENT
PIVOT FOR CHECK RATE ADJUSTMENT
CHECK RATE ADJUSTMENT SCREWS

(in the opinions of many operating personnel) the expenditure of considerable sums to prevent such unwarranted loss of revenue.

Possible Solutions

Since the meter measures by volumetric displacement, any compensating element would either have to adjust the displacement, with temperature changes, or else employ a variable ratio of multiplication in the index.

Each method appears to have its own set of problems. A meter whose displacement (proof) changes with temperature would have to be tested for proof, and have that figure adjusted to a proof at a standard (base) temperature — the amount of adjustment required depending upon the proving room temperature.

The meter with a compensating index could no doubt employ a continuous or intermittent drive, actuated by a bi-metal strip or by a pressure capsule or bellows, with consequent friction and possible slippage with such construction.

Development work on various methods of temperature compensation has been on our laboratory schedules for more than 20 years, to my knowledge, with an intensification of our efforts in recent years.

Promising Method

At the present time, the most promising arrangement seems to be with an open top meter equipped to change its proof with temperature by means of a special tangent employing bi-metal strips to position the tangent wrist. With this construction, the tangent is directly in the incoming gas stream and is subject to a temperature very close to that at which the measurement will occur. Tests indicate that the gas assumes meter temperature almost immediately on entering the top chamber.

The compensating element must necessarily form a rugged member, not subject to either angular or linear dimension change when various forms of internal friction might be encountered.

By employing a dual set of bi-metal elements forming, jointly, a braced and inherently rigid section, the temperature compensated tangent achieves rigidity (and consequent proof stability) comparable to that of a conventional meter. Since the temperature compensated meter might not differ outwardly in appearance from a conventional meter, it should be badged or marked in some manner for identification.

The illustration shows the general construction and indicates the manner of positioning the tangent wrist in proving operations. Construction permits an adjustment by the side screws to bring the check rate to the open rate—without changing the open rate. An adjustment of the lock nuts governs the proof at both check and open rates, equally. This arrangement facilitates proof adjustments, since it reduces to a minimum the mental arithmetic necessary for the operation.

The compensating tangent is inherently adapted to conform with com-

Actual Proof at Base Temp. 60 F	Indicated Proof at Proving Room Temperature				
	60	65	70	75	80
97	97	97.9	98.9	99.8	100.7
98	98	98.9	99.9	100.8	101.7
99	99	99.9	100.9	101.9	102.8
100	100	101.0	101.9	102.9	103.8
101	101	102.0	102.9	103.9	104.8
102	102	103.0	104.0	104.9	105.9
103	103	104.0	105.0	106.0	106.9

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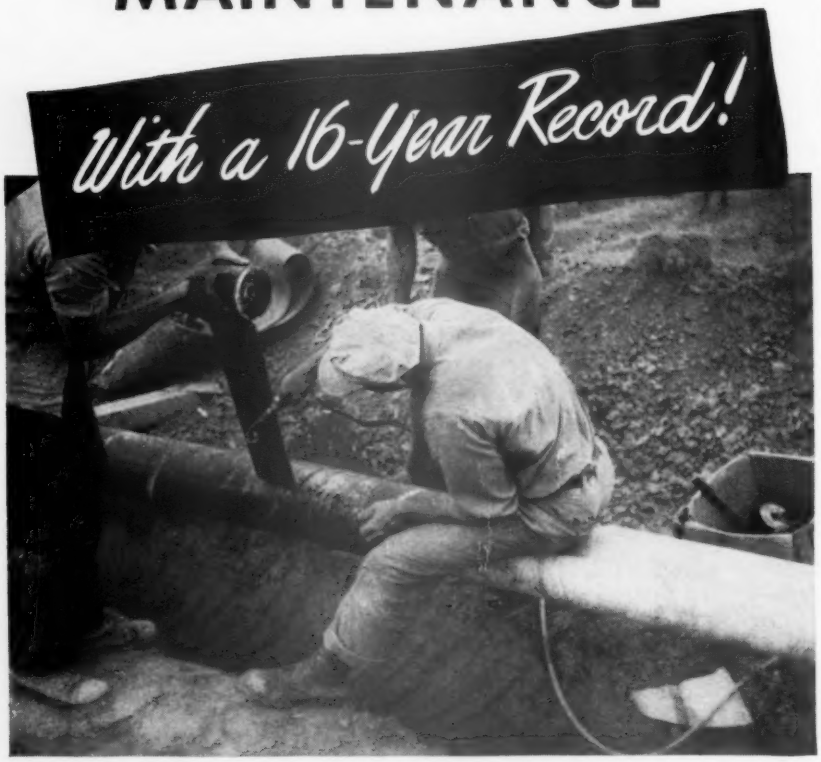
PREVENTIVE MAINTENANCE



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monly designated base temperatures however, for this discussion a base temperature of 60 F will be assumed. If it were desired that a basic or actual proof of 100½ (½ percent slow) prevail at the base temperature of 60 F and if the proving room were at a temperature of 80 F, the meter would have to be adjusted to give an indicated proof (at proving room temperature) of 104.3.

Conversely, if an incoming temperature compensated meter had an indicated proof of 102 percent (2 percent "slow") at both check and open rates, its actual proof at base temperature would be 98.2 percent (1.8 percent "fast").

This demonstrates that proof records for temperature compensated meters would have to be handled in a special manner; however, that procedure is not complicated, and could easily be done with a table similar to that indicated in the abbreviated table.

Acceptance Seen

It is felt that the obviously improved accuracy in measurement will insure an early approval by regulatory bodies should this new concept in metering be viewed favorably by the gas industry.

This would constitute a great convenience for those utilities who feel required to place meters indoors, and where meter reading requirements (or their customers) require that the meters be placed outdoors. It might be construed that a precedent for the use of temperature compensating devices has already been set by the general accepted base volume indexes employed with large capacity displacement meters.

Production of temperature compensated meters is currently limited by the close laboratory supervision imposed on the compensating elements. Those being produced at the present time are limited to test groups to gas companies who wish to run comparative tests on their own properties.

These meters are all fitted with special synthetic diaphragms that permit operation to —30 F without creating an undue meter differential. Extensive tests, both in the laboratory and in the field, under carefully controlled conditions, indicate that the temperature compensated open-top meter fitted with these special diaphragms will perform satisfactorily and give accurate measurement over the range of annual temperatures encountered by a meter set out of doors.

Acknowledgment

This article has been prepared from a discussion presented at the AGA Distribution Conference, Houston, 195[illegible].

* * *

Coming Events

IN THE GAS UTILITY INDUSTRY

December

1- 6 ASME, annual meeting, Hotel Statler, New York.

2- 4 Institute of Appliance Manufacturers, Shoreham Hotel, Washington, D. C.

4 NEGA appliance servicing conference, Hotel Bancroft, Worcester Massachusetts.

January 1958

19-23 National Association of Home Builders Convention, Chicago, Illinois (AGA will exhibit).

23 NEGA, operating division, Hotel Statler, Boston, Massachusetts.

27-29 American Society of Heating and Air Conditioning Engineers, annual meeting, Pittsburgh, Pennsylvania.

30 NEGA, accounting division, Hotel Statler, Boston, Massachusetts.

February 1958

3- 7 Western Winter Radio-Television & Appliance Market, Western Merchandise Mart, San Francisco, California.

March 1958

17-21 National Association of Corrosion Engineers, San Francisco, California.

20-21 NEGA, annual meeting, Hotel Statler, Boston, Massachusetts.

24-26 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colorado.

27-28 Oklahoma Utilities Association, annual convention, Biltmore Hotel, Oklahoma City, Oklahoma.

31-April 2 GAMA, annual meeting, Greenbrier, White Sulphur Springs, West Virginia.

April 1958

8-10 AGA sales conference on industrial and commercial gas, Hotel Schroeder, Milwaukee, Wisconsin.

14-16 National Conference of Electric and Gas Utility Accountants, Shamrock Hilton Hotel, Houston, Texas.

15-17 Southwestern Gas Measurement Short Course, University of Oklahoma, North Campus, Norman, Oklahoma.

17-18 Indiana Gas Association, annual convention, French Lick-Sheraton Hotel, French Lick, Indiana.

28-30 SGA annual convention, Dallas, Texas.

May 1958

4- 7 LPGA annual meeting, Conrad Hilton Hotel, Chicago, Illinois.

4- 7 Air Conditioning & Refrigeration Institute, annual meeting, The Homestead, Hot Springs, Virginia.

5- 9 AGA distribution, production, and transmission conference, The Roosevelt and Commodore hotels, New York, New York.

5- 9 National Restaurant Association convention and exposition, Navy Pier, Chicago, Illinois (AGA will exhibit).

19-23 National Fire Protection Association, annual meeting, Palmer House, Chicago, Illinois.

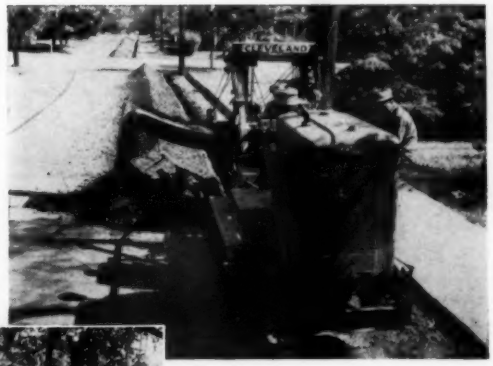
20-22 Pennsylvania Gas Association, annual meeting, Pocono Manor Inn, Pocono Manor, Pennsylvania.

June 1958

1- 4 American Gear Manufacturers Association, 42nd annual meeting, The Homestead, Hot Springs, Virginia.

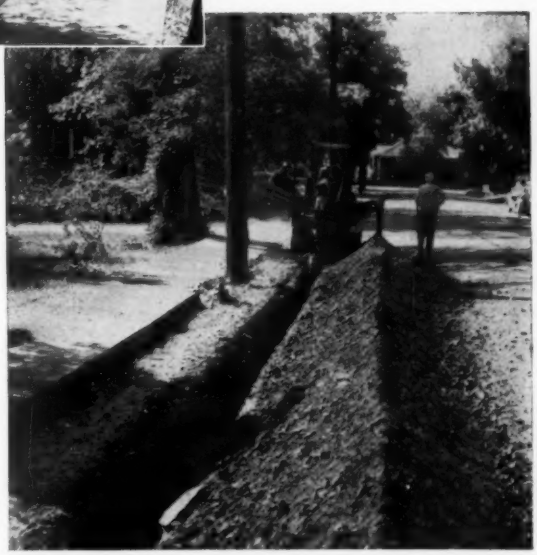
15-19 American Society of Mechanical Engineers, Hotel Statler, Detroit, Michigan.

DIGS STRAIGHT



DIGS CLOSE

DIGS FAST



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Good Everywhere

Prepared by Leo T. Parker, attorney at law and contributing editor

Gas Company Liable for Contractor's Blasting Damage

Liable for Independent Contractor

As explained in last month's column (November), in the State of Ohio, a gas corporation is liable for all damages to private property caused by blasting irrespective of whether the testimony shows negligence on the part of the gas corporation, or its employees. A higher court has also held a gas corporation in Ohio liable for blasting damages done by an independent contractor employed by the gas corporation.

In *Sites v. Atlas Powder Company, 133 N. E. (2d) 671,* the testimony showed facts, as follows: The Atlas Powder Company made a contract with a contractor to install certain gas mains. The contract specified that the contractor would furnish all supervision, labor, tools, equipment and other facilities and all incidental supplies, including explosives; employ only competent, experienced and skilled foremen, mechanics and workmen "to do the work contemplated hereunder"; that the contractor "shall in all respects be deemed to be an independent contractor" and fully liable for his own negligence.

During the work of installing the mains, blasting was done that caused serious injuries and damages to a private dwelling owned by one Sites, who sued the gas corporation. The latter contended that it could not be liable because it contracted with a contractor to do the work, furnish all tools, etc., and assume liability for any and all damages resulting to adjacent property.

Nevertheless, the higher court held the gas corporation liable without any proof that the contractor's negligence caused the damage. The court said:

"It is clear that the gas company is directly charged by plaintiff (Sites) with liability to her for its having procured the construction company to construct a pipeline, in the course of which the use of explosives admittedly caused damage to plaintiff's property. First, plaintiff's (Sites') claim is not predicated upon negligence and the Court neither assumes nor concludes that there was necessarily negligence on anyone's part. There is no evidence whatever that says or infers that 8900 lb of dynamite as spaced and placed was in itself negligence.

This Court cannot say and frankly does not know whether the quantity of dynamite used, or its placement, or its spacing, or the manner of its detonation, or anything else of the numerous factors involved, done or omitted, separately, collectively, or otherwise, constituted anyone's or company's actual negligence.

It is entirely illogical for the construction company to expect to be relieved of liability to a third person as a result of its participation in the execution of its own contract and, at the same time, not relieve from such liability the party, gas company, who contracted to have the work done."

Always Liable

According to a late higher court decision, a gas corporation is always liable for any and all damages effected adjacent property owners as a result of explosions which cause rock or debris to fly through the air.

In *Beecher v. Dull Gas Company, 143 A. 498,* it was shown that a corporation in the State of Pennsylvania blasted by a process of "mud capping," which was performed by placing a stack of dynamite on top of the stone, covering it with mud or dirt, and exploding it with a fuse. This operation resulted in considerable vibration and noise and also threw pieces of broken stone onto surrounding property and houses, the owners of which sued to recover damages.

The corporation attempted to avoid liability on the contention that its employees had exercised great care in preparing the blasts and that property owners could not recover unless they proved that the damages were negligently effected. Notwithstanding this argument, the court held the corporation liable, saying:

"The decided weight of authority supports the view that where one explodes blasts on his own land and thereby throws rock, earth, or debris on the premises of his neighbor, he commits a trespass and is answerable for the damage caused, irrespective of whether the blasting is negligently done."

Also, in *Bessemer v. Doak, 44 So. 627,* decided by a higher court in Alabama, the court upheld the usual rule that if one in blasting invades nearby premises, by throwing stones and debris thereon, he is liable for the resulting injury. However, this court held that for any other injury, such as may result from the mere concussion of the atmosphere, sound, or otherwise, there is no liability unless it is shown that the blasting work was done negligently, and that the injury was the result of negligence, and not the result of blasting according to the usual methods and with reasonable care.

In *Dixon v. New York Trap Rock Corporation, 81 N. E. (2d) 356,* nearby property owners sued a corporation for heavy damages for injuries to their property caused by blasting operations. However, the property owners failed to prove that the alleged damages resulted from negligence of the company's employees when blasting rock.

The higher court refused to award the property owners any damages saying that the mere fact the property owners suffered damages does not justify holding the corporation liable, unless the testimony proves conclusively that the latter's negligence caused the injury.

Old New York Law

For the old law in the State of New York, reference is found in the leading case of *Booth v. Rome, 140 N. Y. 267, 35 N. E. 592.* This court distinguishes between **direct injury,** where rocks or other debris are propelled upon the property of another by blasting and **consequential injury,** such as is caused by concussion or vibration, which by the shaking of the earth injures private property.

Where the testimony shows that private property is damaged by rock, debris and the like thrown by blasting or explosions on private property the one who performed the blasting operations is liable without proof that the blasting

was done negligently by the operator. On the other hand, recovery was not permitted for consequential injury caused by concussion unless negligence is shown in the use of the explosive.

In the California case of *Colton v. Onderdonk, 69 Cal. 155, 10 P. 395*, the higher court held that whenever one uses a violent and dangerous explosive to blast rock or dirt, such use is sufficient to impose a liability for injury, direct or consequential, irrespective of the degree of skill or care exercised in using the explosive. In other words, whenever one damages private property in California by use of explosives he is liable without proof that the blasting operations were negligently performed.

Nevertheless, in the states of New Jersey, Alabama, Kentucky, and Kansas the higher courts held that while any person, firm, or corporation is liable, without proof of negligence, for damages caused by rocks, debris, etc. thrown onto private property, yet no person, firm, or corporation will be held liable for concussion injuries to private property caused by blasting unless the testimony conclusively proves that such person, firm, or corporation did not use ordinary care and was negligent in performing the blasting.

For comparison, in *Blackford v. Heman Construction Company, 132 Mo. App. 157, 112 S. W. 287, 289*, a Missouri higher court enjoined a corporation from blasting and casting of stones on private property and the jarring and vibrating buildings.

In *Benton v. Kernan, 13 A. (2d) 825*, a New Jersey court had before it a situation where 48 owners of homes brought suit to restrain a corporation from blasting whereby their homes were shaken, jarred, and damaged, and their lives made highly uncomfortable by vibrations caused by the blastings. The property owners also alleged that the blasting cast stones upon the lands of some of them, "endangering the safety of the persons thereon and that their peace and comfort" were disturbed and their health affected by the noises occasioned by the blastings, etc.

The higher court in New Jersey issued an injunction perpetually restraining a quarry corporation from discharging blasts of dynamite in such a way as to jar or vibrate homes and buildings, or to cause debris to be thrown upon them, or to cause such noise as would occasion a nuisance, disturbance or annoyance to the home owners. The corporation was allowed a short period of time to make necessary changes or alterations of its blasting methods and drilling methods to eliminate, if possible, the annoying noise and vibrations. * * *

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Human Factors in Good Supervision

Ernest W. Fair

DAY-TO-DAY problems of supervision in a gas utility company are never easy to solve. The ways and means used by supervisors to simplify and expedite the work require continuing study.

Not the least of the factors that call for more investigation is an understanding of the human factors involved in getting the most out of our men. Modern machinery needs only a friendly tap of a wrench or a liberal portion of lubricant dessert to supply cooperation. Not so with the men who use this equipment.

From actual job experience, here are some of the short cuts to the practical supervision of personnel. It may also be noted that they apply the psychological approach that the same individual's wife uses to get him to do those extra chores around the house.

Job Interest

First is a thorough realization that no man can work efficiently who does not have an **interest in his job.** A dutiful husband may empty the garbage for the little woman, but he does it reluctantly. He will display the same lack of enthusiasm for his work on the job unless supplied with a vital interest in that work.

Such interest is inborn in some individuals. But as every foreman knows, men such as these are scarce as television sets at a theater owner's convention. It is one of the primary functions of his job to supply that interest to the men who work for him.

No job can be too drab or routine without some element of interest. In many cases, all the foreman has to do is to discover or create that feature and then point it out to the individual employee. In the routine of daily work we often overlook a score of such interesting factors. Whenever a deliberate effort is made, these interests will become readily apparent.

Ultimate results of a man's work can often provide such interest. Or, the routine skills he uses can be glamorized and made more important to him. Emphasis on increased perfection (presented without wifely nagging) can arouse an interest in seeking perfection on any job. Foreman should never overlook an opportunity to give such ideas to their men.

Attitude Is Important

Second human factor we can profitably keep in mind, is to remember that **ability can be developed if an attitude is present.** Without the proper attitude, no amount of sweat on a foreman's brow can develop ability.

Attitudes are made in great measure by interest in an individual's work, as well as by the foreman's approach. Development of ability depends in great measure on the foreman's ability to arouse the proper attitude of each man toward his work.

When the individual has a negative attitude toward his work, and shows sufficient evidence of skill or ability to make the effort worthwhile, it will pay any foreman to exert a positive effort toward the elimination of such a negative attitude. Until this has been accomplished, 90 percent of his teaching efforts will be wasted.

I give up on Mike — he's a stubborn mule that just won't learn — he simply has the wrong attitude, a foreman was heard to say. Mike may have been a stubborn cuss. But, the practical approach was not a continued pounding by the foreman on job instruction, but careful planning to remove Mike's mental or emotional obstruction. Once such a roadblock has been set aside the task of teaching and instruction, which is a vital part of every foreman's job, becomes as easy as feeding ice cream to a growing boy. Foremen who use this system accomplish their purpose by carefully searching for what lies behind the negative approach in Mike and his fellow workers. Once discovered, these negative ideas are easily removed and positive ones supplanted. Then, ability can be developed to its maximum peak.

Another factor the wise foreman always keeps in mind is that **abilities can remain hidden if no one tries to bring them out.** No girl really knows how to kiss until she meets an expert; it seldom comes natural despite what the songs declare. The ability to do a good job at any spot will likewise remain hidden until the foreman makes a deliberate effort to show the employee the proper response.

Once upon a time there was no income tax—and once upon a time foremanship called for a hard and fast taskmastership over the given skills of every employee. Now, we have plenty of income tax. If we had as wide an application of an intelligent approach by foreman toward developing skills and abilities of their employees, supervisory tasks would be less exacting.

Man really started taking over the face of this earth when in the dim prehistoric days he began using his fingers and thumbs for purposes other than clouting his fellow creatures. The chances are there was one particular individual who was the leader in developing these abilities. He was the foreman of prehistoric times.

Overcoming Inertia

Next on the list of short cuts is a thorough realization that the **average man has a built-in resistance to change.** Unless we keep this in mind, it will take three or four times longer to develop a worker's major skills than it would if we approached the task with this principle. Old working habits sometimes need to be changed. This cannot be accomplished overnight. The foreman who realizes that each man has a resistance to change built into his physical and mental make-up, is the one who always secures the most with the least effort from his men.

It is also important to keep in mind that in order to unlearn an emotional habit, one must supplant it with another. This is always a slow process; try to hurry it and results will never be forthcoming. We are all creatures of emotion, and the emotions necessary to properly approach our jobs do not come naturally.

Most foremen with experience are aware of this factor in handling men, but surveys show that far too many supervisors have the idea that changes can be made quickly. It's a slow process . . . *almost as slow as getting a new idea through the Russian political mind.*

When there are workers who are obviously not satisfied with their jobs, yet show sufficient skills and abilities to warrant their retention on the payroll, the first step should be to try to discover what are their undesirable emotional conflicts and then try to relieve them. After this has been done, conflict on the job is reduced, and the foreman can spend more time reading magazines such as this.

Slant Appeals

Another factor in good foremanship is that **different appeals are needed to obtain different results. One wife uses soft words to get her husband to do an unpleasant task, while another finds liberal application of tongue-lashing brings more results.** Likewise a different approach is needed toward the individual on the job.

Formulas are nice. If we could discover one method of handling a given problem it would simplify our work. But, when it comes to personnel, there simply are no hard and fast formulas. Each man requires a different appeal. The foreman who finds and uses the right approach generally is the one whose department has the best work record.

Human factors in good employee supervision are as important as any other phase of the job. When made a routine part of daily procedures, the tasks of supervision and getting the work done are always simplified. ★ ★

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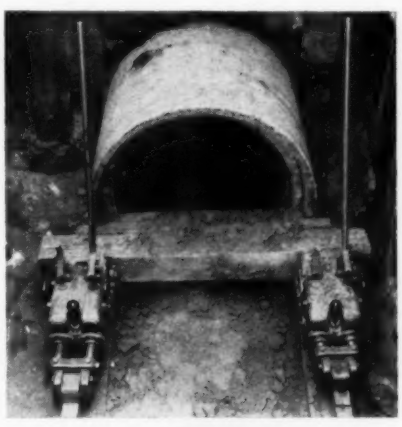
Here's the simple, cost-cutting way to install underground pipe. Speed your jobs with a GREENLEE Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, backfilling, tamping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes — model shown above for pushing 3/4" to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump (as shown above) also available for extra ease and speed of operation.



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Men At Work IN THE GAS UTILITY INDUSTRY

● **Alvan V. Brashear** has been appointed manager of operations of Michigan Consolidated Gas Company.

A. V. Brashear

J. C. Dezelle

● **John C. Dezelle,** assistant division manager of United Gas Corporation at Beaumont has been promoted to assistant operating manager of the company's Texas distribution operations.

● **M. D. LaGrone** has been elected vice president and treasurer of Consolidated Gas Utilities Corporation.

● **Bruce A. McCandless,** formerly assistant managing director of the American Gas Association, has been elected vice president in charge of sales for Milwaukee Gas Light Company.

● **Milton C. Baldridge** has been elected secretary of The Columbia Gas System, Inc.

● **Robert L. Swank** has been appointed manager of sales – plastic pipe for National Tube Division of United States Steel.

● **Frank W. Jenks,** formerly executive vice president, International Harvester Company, has been elected president. He succeeds **Peter V. Moulder,** who has retired.

● **Jacob R. Harvin,** vice president and counsel for Columbia Gas System Service Corporation, has been elected vice president and director of The Columbia Gas System, Inc.

● **John C. Bolinger, Jr.,** has been elected president and director of East Tennessee Natural Gas Company of Knoxville.

● **Mahlon A. Combs,** secretary of the AGA Industrial and Commercial Gas Section, has retired. He will continue to serve AGA as a full-time consultant on Utilization Bureau service manuals. **Ralbern H. Murray** succeeds him.

● **Dale B. Otto** has been elected vice president of the New Jersey Natural Gas Company.

● **John Lawrence** has resigned as president of Joy Manufacturing Company to accept the position of vice president of Dresser Industries, Inc.

● **R. L. Morton** has retired as vice president and director of Cities Service Gas Company after 37 years of service.

● **Robert E. Ginna** has become chairman of the board and chief executive officer of Rochester Gas and Electric Corporation. He succeeds **Alexander M. Beebee,** who has retired. Beebee has become chairman of the executive committee and will continue as a member of the board of directors. **Ernest J. Howe,** formerly vice president and comptroller, has been appointed president and **Leo H. East,** formerly vice president in charge of operations, has become executive vice president.

● **Robert B. Herrold** of Columbus has been promoted to assistant treasurer in charge of customers accounting and collecting for the Ohio Fuel Gas Company.

● **Col. Willard F. Rockwell,** board chairman of Rockwell Manufacturing Company, has been appointed to the National Defense Committee of the U. S. Chamber of Commerce for a term of one year.

● **Harry H. Fitzgerald** and **Leonard Milano** have been elected vice presidents of Commonwealth Services Inc., management and engineering consulting firm of New York.

● Temco, Inc. of Nashville, Tennessee, has announced the appointments of **R. E. "Bill" Rutherford** as Mid-South regional sales manager, and **William T. Brent** as sales promotion manager.

● **Williard A. Burnett** has been promoted to chief accountant in the comptroller's department of Public Service Electric and Gas Company. Formerly he was assistant chief accountant.

● **Beverly D. Taylor** has been appointed treasurer of Robertshaw-Fulton Controls Company. He formerly was controller. **Walter H. Steffler,** who resigned as treasurer, will continue as company secretary. **John C. C. Byrne,** controller of the Gray-Gravson Controls Division, has been named controller and **James A. Witt** has been appointed assistant secretary.

● In a realignment of executive responsibilities of Davey Compressor Company, **Paul H. Davey, Sr.,** company founder and president since 1929, has been elected to the newly-created position of chairman of the board of both Davey Compressor Company and Davey International, Inc. Succeeding Davey, Sr., as president is his son, **Paul H. Davey, Jr.,** formerly vice president in charge of production. New president and treasurer of Davey International and general manager of Davey Compressor is **J. T. Myers,** previously vice president in charge of sales.

● **Charles N. "Chuck" Perry** has been named factory manager of Rockwell Manufacturing Company's new Porterville, California, plant.

● **John T. Allen** has been appointed field engineering supervisor in the Dallas, Texas, district of the ElectroData Division of Burroughs Corporation.

● **Ralph W. Fouse,** vice president and member of the board of directors of Brooklyn Borough Gas Company, has been named to the additional post of treasurer of the company.

● Several recent supervisory changes in the operations department of Milwaukee Gas Light Company are: **John Wilson, Walter Campbell,** and **Alvin Fuhrman,** general foremen in the distribution-construction and repair department have been made superintendents in the same department; **Norman Burzlaff,** general foreman, valve and governor department, also was named a superintendent in the distribution-construction and repair department. **Joseph L. Price,** general foreman, distribution-construction and repair, is now superintendent, valve and governor department.

● **H. E. Robinson, Jr.,** has been appointed assistant general counsel of Equitable Gas Company and subsidiaries.

● **F. Warren Cooper,** vice president and comptroller of Public Service Electric and Gas Company since 1954, has retired on pension after having completed 37 years of service with the company.

● **Edward Emerson, Jr.,** has been appointed employee relations manager of New York State Natural Gas Corporation. He will oversee personnel administration and labor relations, the safety program, and annuities and benefits administration.

● **J. Wilson Gaw,** director of public relations for Washington Natural Gas Company, has been elected vice president of public relations.

● Recent promotions among management personnel of The Peoples Gas Light and Coke Company of Chicago, include: **Arnold Labahn** who was promoted to senior architectural designer, and **Richard A. Theml** who was promoted to senior architectural designer of the design, display, and home planning department; **Curtis R. San Galli** and **John A. Ullrich** who were promoted to senior engineers in the engineering department.

● **Ray R. Eppert** and **Robert B. Semple** have been elected to the board of directors of Michigan Consolidated Gas Company. Semple is president and a director of Wyandotte Chemicals Corporation and Eppert is executive vice president of Burroughs Corporation.

● **Roy C. Mitchell, Donald E. Kohart** and **John Q. Vreeland** have been named sales representatives by American Meter Company. Mitchell will work in the Rochester, New York, area, Kohart in Boston, and Vreeland in the Wynnewood, Pennsylvania, sales district. Other sales announcements include **Bynum C. Jacobsen** who has been named sales engineer in the Chicago sales district and **Clifford E. Saylor,** who has been appointed engineer in the telemetering department at the company's Erie, Pennsylvania, plant.

● Northern Illinois Gas Company has reported the following personnel changes: **Dave Meiller** has been named engineer assistant to the manager of operations; **Glenn Kirk,** former staff assistant, was named to replace Meiller as superintendent of distribution; **Pete Larson** has been appointed to the post of assistant chief engineer, and **Edwin Culp** to station design engineer succeeding Larson.

- DEATHS -

R. R. Paulin

Roland R. Paulin, vice president and manager of operations of Michigan Consolidated Gas Company, died October 26 in Detroit. He was 55.

F. J. Rutledge

Fred J. Rutledge, retired vice president of The United Gas Improvement Company, died October 16 at his home in Philadelphia. He was 83.

W. C. Coleman

W. C. Coleman, founder and chairman of the board of directors of The Coleman Company, Inc., died November 2 in Wichita, Kansas. He was 87. The company he founded at Kingfisher, Oklahoma, in 1900 became a leading manufacturer of heating and air conditioning equipment with factories in Wichita; LaPorte, Indiana; Toronto, Canada; and Nijmagen, Holland. Coleman relinquished presidency of the company in 1951 to his son, Sheldon Coleman. He continued actively as chairman of the board of directors until his death.

Charles Bollinger

Charles Bollinger, of American Meter Company, died September 25 after a brief illness in Shaftsbury, Vermont. He was 84.

E. G. Ploeger

Edward G. Ploeger, Dallas, southwestern regional sales representative for Arkla Air Conditioning Corporation, died October 29 of a heart attack. Prior to acquisition of Servel's air conditioning division by Arkansas Louisiana Gas Company, Ploeger served Servel in the same capacity.

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"Trouble-Shooting" Tip to Utility Service-Men

When a gas-vent installer places the red-and-black Metalbestos "Safety System" Seal above an appliance's draft hood, he's helping the service-man locate any future gas installation trouble . . . by telling him it's *not* in the gas vent. That's because the Safety Seal means an all-Metalbestos gas vent, designed and installed according to the Metalbestos "Safety System" Gas Vent Tables.

The Metalbestos "Safety Seal" stands for scientific, quality gas venting . . . free from unhealthy spillage at the draft hood and corrosive condensation within the vent. Learn to look for the Metalbestos "Safety Seal" and promote its use. It's good for your business . . . good for gas.

For complete information on the new Metalbestos "Safety System," write Dept. AA-12.

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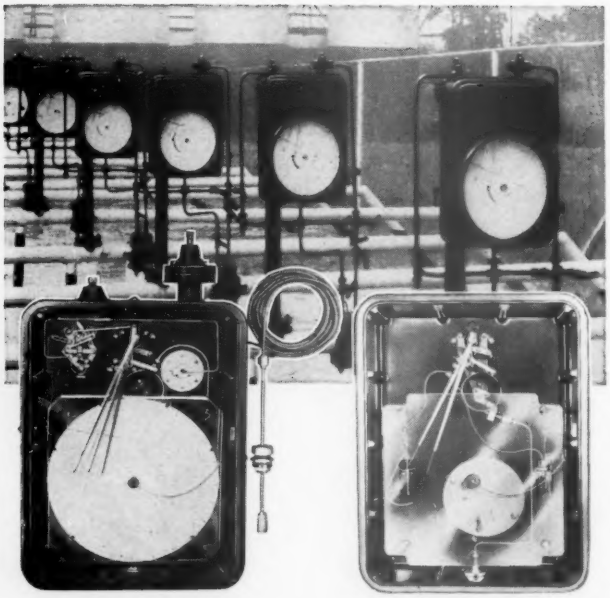
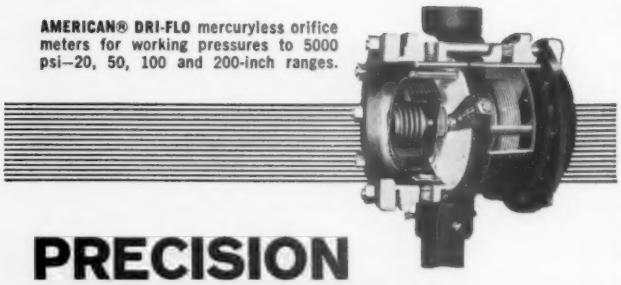


AMERICAN-WESTCOTT Series A-88 recording orifice meters for flow, pressure and temperature measurement—working pressures to 5000 psi—10, 20, 50, 100 and 200-inch ranges.

CANNON METER PENS for recording meters, available if desired, provide clear, legible chart records—hold up to a year's supply of ink.

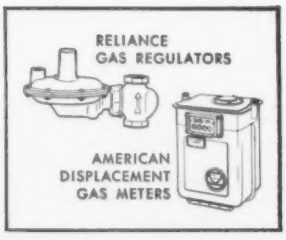
AMERICAN® DRI-FLO mercuryless orifice meters for working pressures to 5000 psi—20, 50, 100 and 200-inch ranges.



PRECISION MEASUREMENT

of flow, temperature, and pressure on one chart

Wherever precision measurement and economy of operation are required; at high or low flow rates, at varying temperatures, whether in recording, indicating, integrating or telemetering models, American orifice meters are synonymous with accurate, dependable, trouble-free service and low maintenance costs.



AMERICAN® METER COMPANY
INCORPORATED (ESTABLISHED 1836)

GENERAL SALES OFFICE: Philadelphia 16, Pennsylvania • Albany Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle Tulsa • Wynnewood. IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Regina

SUPPLIERS TO THE GAS INDUSTRY for ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

Peak Shavings

. . . . with laughing gas

A lady was overheard on the street the other day saying, "My husband's not as big a fool as he used to be."

"Oh?" asked her friend.

"Yes," she said, "I don't know what's caused it, but he's thinner."

Beginning of wisdom is the realization that the thing you're anxious about today won't seem so important tomorrow.

Different from Love, Life is just one fool thing after another, while Love is just two fool things after each other.

No brain is stronger than its weakest think.

Two six-year-olds were having a discussion. Its content was so startling that the mother of one of them stayed to eavesdrop.

"You know," said Cynthia, "you have to have a man to have a baby."

"You do!" exclaimed Amanda. "Why?"

"Well," Cynthia reasoned, "Someone has to pay for everything."

To feel themselves in the presence of true greatness many men find it necessary only to be alone.

History proves that people who go to great lengths to find an easy way out usually fall short.

One businessman to another: "We're a non-profit organization. We didn't mean to be, but we are."

Life's an everlasting struggle to keep money coming in and teeth and hair from coming out.

Henry had taken a strong dislike to his kindergarten class. All persuasion failed to make any impression on his agile little brain, and his mother finally told him that he would have to go to school whether he liked it or not.

"All right, Mom," complained Henry, "if you want me to grow up to be a bead-stringer and a paster-upper, I suppose I'll have to go!"

It may be all right to be content with what you have, but never with what you are.

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and special equipment for every requirement

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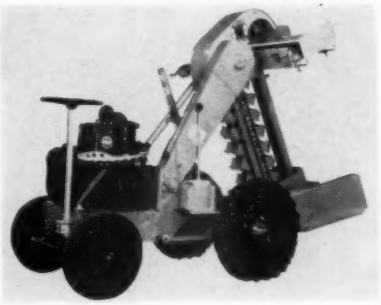
NEW EQUIPMENT
OF THE GAS UTILITY INDUSTRY

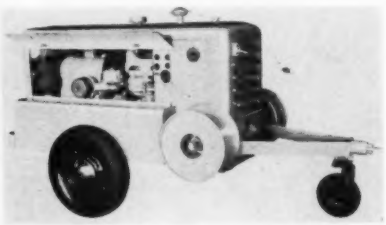
For more information on items described here in brief, use the handy reply card and circle the corresponding numbers



New Model Ditch-Witch Trencher. Charles Machine Works has announced a new model LD Ditch-Witch Trencher designed to provide contractor, utility company, and municipality a low cost, high performance trencher for service lines and footings. Unit is completely mobile with trenching speeds up to 8 fpm and road speed up to 5 mph. Standard trench widths are available from 4- to 16-in. at 2-in. intervals. Machine will dig a 4- or 6-in. trench to a depth of 42-in. Approximately 6-in. less depth is obtainable for each additional 2-in. width of trench. Other features are: 18 hp engine, automotive type steering, reversible spoils conveyor, double acting hydraulic pump for raising bucket line, and 15-in. drive wheels for increased traction. *The Charles Machine Works, Inc.*

CIRCLE (1) ON THE REPLY CARD

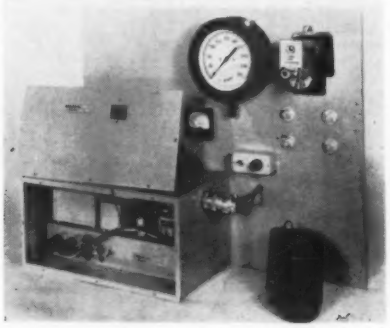
Rotary Compressor. New 125 cfm rotary compressor has been announced by Davey Compressor Company. Known as the



Davey Hydrovane Rotary 125, the multistage rotary compressor features a single free-floating rotar, that is so located that it is constantly concentric with one side only of the stator. Blades are of the segmented type, inserted radially in longitudinal slots that move continuously in a straight line from the stator center and cannot "cock" or bind. Continuous cooling action lowers air discharge temperatures as much as 100 deg below other compressors. Volumetric efficiencies up to 92 percent are claimed for the new unit. Other features include primary and secondary intake air cleaners, 3-stage oil separator, and single adjustment vacuum-hydraulic, supply-demand control. Sight windows are provided for visual inspection of lube oil conditions and the oil separation process. Units are available in 2-wheel trailer and skid mountings. *Davey Compressor Company.*

CIRCLE (2) ON THE REPLY CARD

Inexpensive Electronic Gas Flow Measuring System is now available. Designed by Computers Incorporated of Houston and sold through Oil Metering and Processing Equipment Corporation's national sales organization, the system provides range, accuracy, and speed of response comparable to other electronic flow measuring



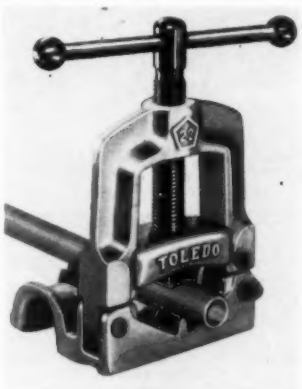
system, yet is priced competitively with lower cost, mechanically operated measuring systems. Unit measures flow of gas through an orifice plate by means of electrical signals proportional to the flow rate and accumulated flow. An adapter adjusts instrument's calibration to conditions of the measurement problem. Computer contains magnetic amplifiers, silicon diodes, and transistors; has no moving parts and does not generate a large amount of heat as do vacuum tube circuits. Unit is accurate to within 1 percent of full scale output with 20 percent or more flow. Long-term accuracy is rated with one-quarter of 1 percent. These ratings exclude pressure and temperature input elements, for which compensation adjusters are available. *Oil Metering and Processing Equipment Corporation.*

CIRCLE (3) ON THE REPLY CARD

Treats by Heat. Surface Combustion Corporation has announced a new specially designed heat treating furnace that prevents erosion of aircraft parts. In the photo a load of jet engine compressor blade rings are being unloaded from a Pit Type Draw Furnace. Unique construction of the basket facilitates discharging of the rings by use of an overhead joist. One complete charge weighs about 940 lb. Tempering is carried out between 1100-1200 F using cycles from 2 to 6 hours. *Surface Combustion Corporation.*

CIRCLE (4) ON THE REPLY CARD

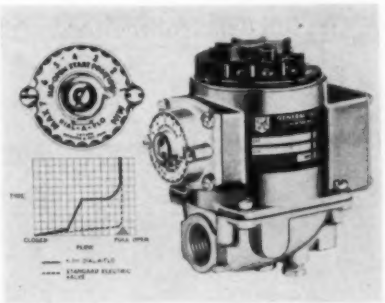
Pipe Vise. Completely new pipe and conduit vise, designed for lifetime use and



featuring a number of design improvements has been announced by Toledo Pipe Threading Machine Company. The No. 22 Vise is built with strong, sturdy frame and large diameter acme screw thread connected directly to the upper jaw for longer service. *The Toledo Pipe Threading Machine Company.*

CIRCLE (5) ON THE REPLY CARD

Electric Gas Valve. New concept in main line electric gas valves has been announced by General Controls with the introduc-



tion of the K-3H Hydranoid Valve with the new step opening feature "Dial-a-Flo." For the first time manufacturers can tailor valve performance to their exact requirements by merely setting the dial. "Dial-a-Flo" has been incorporated on the established K-3H valve, the only sealed operator valve with silicone fluid, the liquid that maintains uniform operating characteristics under all weather conditions. *General Controls.*

CIRCLE (6) ON THE REPLY CARD

Jetglas Storage Booster. A completely jetglas lined storage booster (Type "B" unit) has been announced by Day & Night Mfg. Co. AGA approved, the new unit is gas fired and features an input of 220,000 Btu/hr on the 100 gal size. The 100JSB reheats 184.8 gal per hour on a 100 deg rise and is approved for use with 180 degree water. A 360 degree traverse turret with size vent provides for either horizontal or vertical venting, easing many difficult installation problems. *Day & Night Mfg. Co.*

CIRCLE (7) ON THE REPLY CARD

The new Superior ALUMINUM CASE METERS

. . . the slow-motion meters you can rely on longer

This slow-motion, long-lived meter operates at only 7 revolutions per cubic foot to reduce wear and stay accurate longer. And its simple, horizontal seam construction gives fewer chances for leaks . . . makes maintenance quick and simple. Whether it's adjusting the tangent through the handy access in the top . . . removing the top to grind the valve seat . . . or lifting out the valve table with the entire inner movement to replace the diaphragm, simply loosening a few screws makes everything accessible.

Get full details. Send for bulletin 1150.

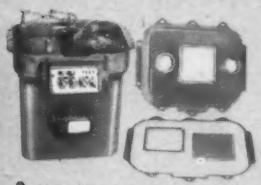
This modern meter exploits all the time-tested advances in meter technology *plus* the latest manufacturing techniques of Superior's new plant.

SUPERIOR METER COMPANY, INC.
19 West 50th Street, New York 20, N. Y.
A SUBSIDIARY OF NEPTUNE METER COMPANY

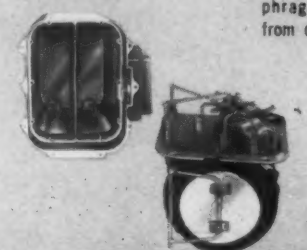
neptune

Look at these advanced design features:

1. Simple, horizontal seam . . . eliminates leakage . . . easier maintenance
2. Easily accessible table . . . just remove the screws holding top



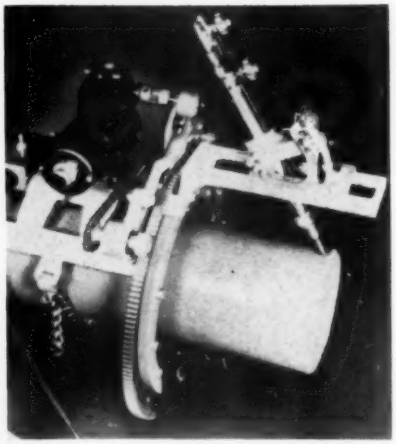
3. Meter top removable without taking off index box
4. Valve seat readily accessible for grinding when top is removed
5. Slow movement; only 7 revolutions per cubic foot
6. Seam gasket stays resilient . . . cork and Buna-N composition
7. Valve table lifts out with entire mechanism



8. Heavy-duty, sintered bronze bearings oil-impregnated for life
9. Flag arrangement gives arm smoother operation and longer life
10. Accurately controlled diaphragm . . . no inaccuracies from deflection
11. Cupped handling lids permit easy and safe carrying
12. Handy access for tangent adjustment and calibration
13. Broad base for solid stacking . . . designed for conveyorized handling
14. Index removable without removing meter

In 250 cfh and 340 cfh sizes to meet most domestic requirements.

Motorized Unit Attachment. H & M Pipe Beveling Machine Company has announced a new motorized unit attachment for their pipe cutting and beveling machines. Unit provides completely automatic operation in cutting and beveling pipe, ranging in size from 1½ to 36-in. Unit can be attached to any of H & M's seven standard machines. It is powered by a fractional horsepower a-c, d-c electric motor that is affixed to the machine by means of a mounting bracket. Switching from manual to automatic or vice-versa, is accomplished by quickly detaching unit from mounting bracket. Flexible coupling is used to connect motor with crank pinion, which drives main gear and cutting torch around the pipe. *H & M Pipe Beveling Machine Company.*



CIRCLE (8) ON THE REPLY CARD

Cathodic Pipe Protector. A high current density, industrial type selenium rectifier especially suited for cathodic protection equipment used on distribution mains has been developed by Radio Receptor Company, a General Instrument Corporation subsidiary. The new selenium cells have a life expectactancy of 100,000 hours. Rectifiers are manufactured under a highly controlled vacuum process developed by the Siemens organization of West Germany. For the same current load the cells are only half the size of conventional selenium stacks, yet they have a lower voltage drop. Long life, negligible aging characteristics, and low voltage drop, attributed to the special vacuum technique and processing which eliminates the artificial barrier layer characteristic of other selenium power cells, greatly reduce servicing problems in maintaining cathodic protection equipment. *Radio Receptor Company, Inc.*

CIRCLE (9) ON THE REPLY CARD

Portable Car Top Sign Frame. On one vehicle or a fleet, the Pan-O-Rama portable car top sign frame, manufactured by Connecticut Devices Company, can present your selling message hour by hour, day by day throughout the year — coming, going, parked. The aluminum, sturdily constructed frame will not rust. Unit is road tested, and is safe. Holds two 11 by 28-in. truck cards, back to back. Fits all truck cabs and pleasure car tops. Can be adjusted on or off in five minutes. *Connecticut Devices Company.*

CIRCLE (10) ON THE REPLY CARD

For Explosive Atmospheres, A New Switch. A new differential pressure switch Model 932, senses a pressure difference between two variable pressures or a variable and a reference pressure, and permits opening or closing of a circuit on increasing or decreasing pressure difference from 15 to 10,000 psi at any point within the adjustable range of the unit. Model 932 is available in four classes of proof pressures from 500 to 12,000 psi. Unit operates in any position, simplifying installation and facilitating portable installations. *Barksdale Valves, Pressure Switch Division.*

CIRCLE (11) ON THE REPLY CARD

Gas Emblem Pin. Lowest cost gas industry emblem pin ever offered, is now available from Handy Flame. A metal pin one inch high, it may be used either as a lapel pin for men or as a scatter pin for women. Known as Type C, pin is decorated in two shades of blue enamel, trimmed with a white gold electroplated finish. *Handy Flame.*

CIRCLE (12) ON THE REPLY CARD

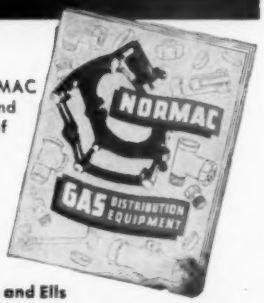
NORMAC

Couplings, Sleeves and Fittings . . .

- Save Time
- Handle Easily
- Give Dependable Service

Because They Offer...

- Maximum Deflection
- Ease of "Stabbing"
- Complete Confinement of Rubber



Today, write for your free copy of this NORMAC catalog . . . complete with illustrations and specifications on the entire Normac Line of Couplings, Sleeves and Fittings. It's a profitable step in the cost-cutting direction.

NORTON-McMURRAY MFG. CO.

919 North Michigan Ave., Chicago 11, Ill.

Couplings • Meter Bars • Sleeves
Cocks • Ball Joint Clamps • Service Tees and Ells

New HIGH.....POWER
.....TORQUE
Air MOTORS

. . . ample power to rip through tough roots and earth formations . . . full speed and torque right up to stalling point . . . safer to operate than engine or electric drives.

FASTER Pipe Installation — LESS WASTED TIME

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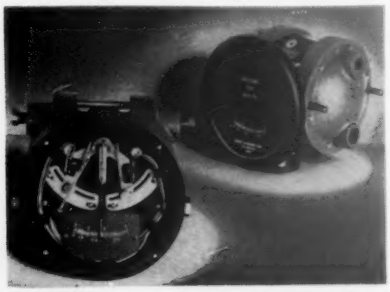
*REG. U.S. PAT. OFFICE

HYDRAUGER CORP, LTD.
681 MARKET STREET
SAN FRANCISCO 5, CALIF.

HY-33A

New Equipment

Indicating Flow Switch. Model 234 indicating flow switch features the Barton Model 199 rupture-proof bellows unit.



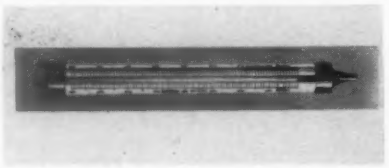
Differential pressure ranges are available from 0-20-in. w. c. to 0-50 psi with static pressure ratings up to 6000 psi. Flow switch can be supplied with either aluminum, steel, alloy steel, or stainless steel housing. Units can be supplied with low or high single setting, or low and high, low-low or high-high double settings each separately adjustable and direct set on an auxiliary scale. It features mechanically operated milli switches rated at 5 amps maximum at 120 v a-c that are virtually unaffected by vibration. *Barton Instrument Corporation.*

CIRCLE (13) ON THE REPLY CARD

Transcope Pneumatic Controller. Taylor's new "Transcope" Pneumatic Controller provides an accurate, compact means of maintaining a given set point in a modern process industry by relaying measured variables for subsequent corrective action via a final control element such as diaphragm valve, lever motor, etc. Inherent characteristics of the "Transcope" make it ideal for the varying time constants of modern processing and for short span measurement. Unit makes unique use of the motion-balance principle through interconnected multiple bellows and springs acting on a common force plate. Primarily for back-of-panel board application, the plug-in feature makes possible mounting to a separate manifold located either at the point of measurement or the point of control. *Taylor Instrument Companies.*

CIRCLE (14) ON THE REPLY CARD

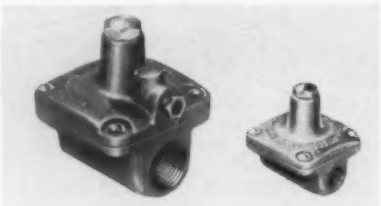
Manometer. New Gasco Ideal Direct Reading Manometer has been developed



by The Gas Appliance Specialties Company. Unit is a modern precision instrument for direct reading of pressure, vacuum, and differential. Easily read the same by everyone. No calculations necessary. Fluid is self-contained. Made of nonbreakable precision plastic, the unit is light in weight — just over two oz. Case is etched, annodized aluminum and special cap retains reading whenever desired. Maintenance and utility men will find manometer suited for their work checking installations or for trouble shooting. *Gas Appliance Specialties Co., Inc.*

CIRCLE (15) ON THE REPLY CARD

Safety Regulator. Gas Appliance Specialties Company has developed a modern, practical safety gas regulator that gives maximum protection for the gas user. Quickly and easily installed, the regu-



lator offers these advantages: Shuts off automatically in event of main pressure failure, diaphragm failure, or if overloaded above designed load caused by broken pipes, fittings or leaks. Must be manually reset to restore service when repairs have been made. At 300 deg F Gasco regulator instantly shuts off and cannot be reset. Offers ideal fire protection. *Gas Appliance Specialties Company, Inc.*

CIRCLE (16) ON THE REPLY CARD

Low Cost Pipe Machine. New, lightweight power drive for hand pipe tools has been introduced by The Oster Mfg. Co. Low

cost of the new machine, Oster "100," is its outstanding feature. Unit has a full 2-in. standard pipe range and up to 12-in. diameters using a special drive unit and geared tools. Compact, lightweight design — only 77 lb — makes unit ideally suited for one-man handling and one-man operation. Machine can be mounted in a variety of ways to fit every need. In addition to the hinged, folding stand, it can be bolted directly to work bench or clamped on a track, bench, or other suitable mounting by a special "C" clamp attachment. *The Oster Mfg. Company.*

CIRCLE (17) ON THE REPLY CARD

The WILKINSON LINE LOCATOR

PREVENTS COSTLY DAMAGE

Spots all sub surface pipes, cables, etc., and determines their depth accurately.

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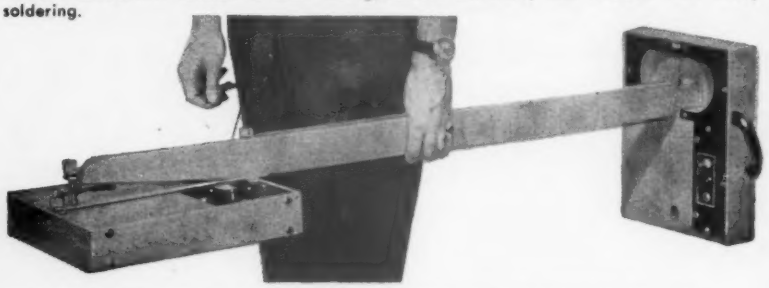

BATTERY TESTER: instantly indicates battery condition without removing batteries.

INSTRUMENT CASE: Made of tough, wear resisting phenolic material. The antennas are an integral part of cases, moisture and shock proof.

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Things to write for . . .

Bulletins, brochures, books of interest to gas utility industry people

Basic Safety Controls for Steam Boilers. A 24-page book published by McDonnell & Miller, Inc., covering basic safety controls for all low pressure steam boilers is now available. It is a companion piece

to a previously issued booklet covering safety controls for hot water space heating boilers. New "steam" book tells the story in simple diagrams and explanation; wastes no words on product description; adheres to the "why" and "how" of all authoritative methods of providing maximum safety and automatic water level control for all low pressure steam boilers. Every case is fully, yet briefly, covered — from the small domestic boiler to the multiple boiler installation with mechanical return system. *McDonnell & Miller, Inc.*

CIRCLE (61) ON THE REPLY CARD

Coffee Urn Thermostat. Throttling type temperature control for commercial gas-fired coffee urns and coffee makers is fully described in a bulletin now available from Robertshaw-Fulton Controls Company. Model "GC" thermostat, a rod-and-tube type control, is rated at 49,500 Btu for manufactured gas, 73,200 for natural gas, and 157,000 for LP-gas. Bulletin contains detailed cut-away diagram of the control, as well as a drawing showing dimensions. Control has a "quick boil" setting which allows water to come to a boil in the shortest possible time. To maintain the boiling point, the dial is re-set to "boil." *Robertshaw Thermostat Division, Robertshaw-Fulton Controls.*

CIRCLE (62) ON THE REPLY CARD

Rotary Air Compressor. An eight-page, two-color bulletin, P-106B, describing the new 600 Rotary air compressor has been issued by Le Roi Division, Westinghouse Air Brake Company. Thirty-eight photographs illustrate what manufacturer describes as "the newest with the most." Close-up views of 33 features are shown, as well as several overall views of the new compressor. General specifications are listed. Design and "unit construction" of the compressor, which allows individual cylinders to be removed, decreasing down-time on repairs and increasing maintenance accessibility, are described. *Le Roi Division, Westinghouse Air Brake Company.*

CIRCLE (63) ON THE REPLY CARD

Standard Revisions for Central Heating Appliances. Copies of the revised provisions of the American Standard Approval Requirements for central heating gas appliances may be obtained from the AGA Laboratories. Provisions pertain to electrical equipment and wiring used on gas boilers, central furnaces, floor furnaces, and vented recessed heaters. They will be applied to all central heating equipment submitted to the AGA Laboratories for approval tests after January 1958. Equipment manufacturers, however, may have the necessary test work performed any time prior to the effective date. *AGA Laboratories.*

CIRCLE (64) ON THE REPLY CARD

AMA Catalog. New 1957-58 catalog of all current American Management Association publications, periodicals, and films is now available. Catalog, entitled "AMA Management Bookshelf," has the latest listing of reference materials that serve as basic sources of information for a professional manager. *American Management Association.*

CIRCLE (65) ON THE REPLY CARD

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New House Service Regulator

NEW ALUMINUM BODY AND TOP
CAST IRON INLET UNIT
V-TYPE STAINLESS STEEL BAND

ONLY ONE STAINLESS SCREW with nut to remove for complete orifice and valve pocket. Permits exchange of diaphragm case without removing inlet unit from line.

Supplied as:

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2. No seal type with automatic cutoff
3. Internal diaphragm operated relief valve for complete over pressure protection
4. Internal diaphragm relief and automatic cutoff

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ANDERSON, INDIANA

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"RUBBER CONDITIONER" —Rejuvenating Rubber Gaskets
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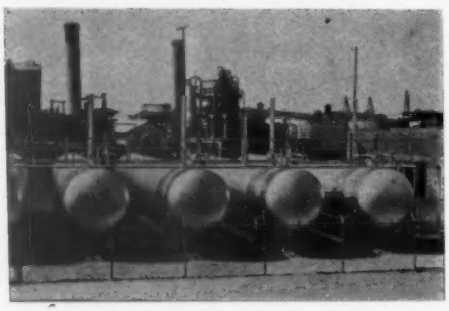

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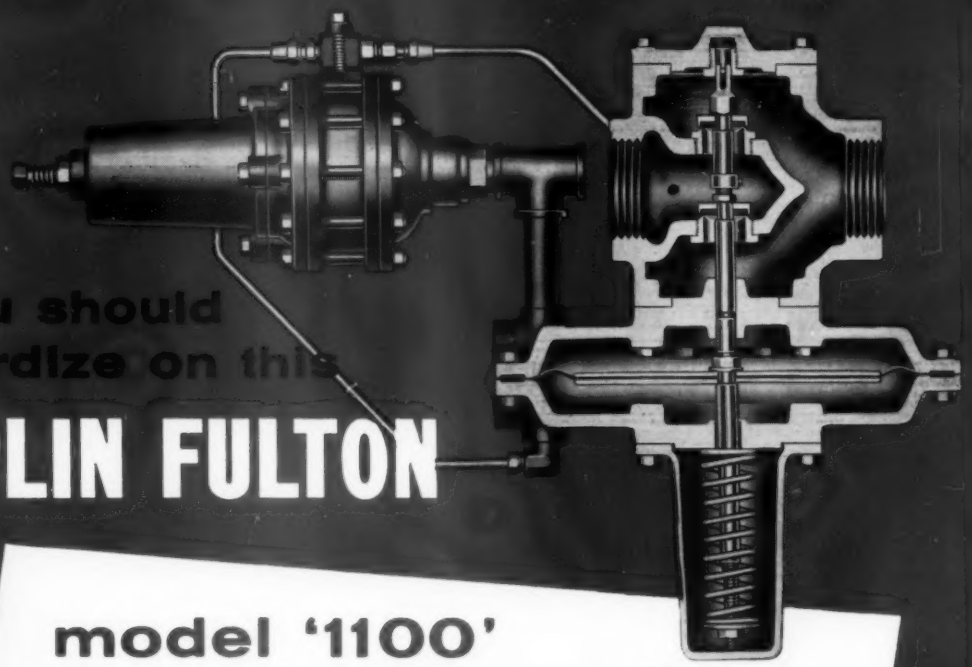

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the heart of model 1100

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